INTERNATIONAL JOURNAL OF JUDICIAL LAW

# Digital Platforms and Innovation Diffusion among United States of America Small Manufacturers: A Review of Collaborative Online Communities

**Samuel C Arinzechi [1*], Noel N Kelong [2], Emeka A Eugene [3]**
[1] International Business School, Brandeis University Waltham, USA
[2] Department of Information Techology and Project Management, New England College Henniker, USA
[3] Management Sciences Department, Lagos State University, Lagos, Nigeria

* Corresponding Author: **Samuel C Arinzechi**

## Article Info

**ISSN (online):** 2583-6536
**Volume:** 04
**Issue:** 06
**November - December 2025**
**Received:** 01-09-2025
**Accepted:** 03-10-2025
**Published:** 27-10-2025
**Page No:** 17-23

**Abstract**
This paper explores how digital platforms affect innovation diffusion among small U.S.-based manufacturers and focuses on collaborative online communities. Based on data from the U.S. Census Annual Business Survey (ABS, 2015–2022), supplemented by evidence from the Business Enterprise Research and Development (BERD) survey, Kauffman Firm Survey (KFS), and Crunchbase case-level evidence, the analysis sheds light on prominent trends in digital technology adoption and their connection to innovation outcomes. Descriptive findings reveal consistently increasing adoption rates for cloud computing, robotics, and data analytics and identify cloud computing as fastest-diffusing technology consistent with diffusion-of-innovation theory. Correlation analysis based on ABS microdata provides evidence for a statistically significant positive link ($r = 0.42$, $p < .01$) between cloud adoption and 2017 product innovation likelihood, indicating digital infrastructures with scale economies facilitate reducing information and coordination cost and stimulate experimentation and new-product formation. Case-level evidence based on digital manufacturing communities like ThomasNet, Maker's Row, and Xometry further exemplifies digital ecosystems supporting survey findings by allowing collaboration and knowledge spillovers as well as access to market areas. The research concludes with policy and practice implications by highlighting digital infrastructure investment and supporting collaborative platforms with targeted measures and measures to enhance equitable digital access as digital levers to accelerate innovation diffusion in U.S. manufacturers.

**Keywords:** Diffusion of Innovation, Cloud Computing, Product Innovation, Collaborative Ecosystems, Technology Adoption, Small Business Competitiveness

## Introduction

Small and middle-sized producing businesses are a bedrock element of United States of America (USA) economics, comprising most producing units and employing millions in rural and urban areas (Small Business Administration, SBA, 2025) [24]. Nevertheless, with all this importance, small producing firms are faced with persistent challenges like limited Research and Development (R and D) funds, insufficient managerial and technology expertise, fragmented supply networks, and difficulty absorbing external knowledge, all hampering their ability to absorb sophisticated technology and innovate at a rate equal to larger players (National Center for Science and Engineering Statistics, NCSES, 2022; National Institute of Standards and Technology, NIST, 2024) [19-20]. However, over the last decade, the rapid spread of digital platforms like B2B marketplaces, discovery networks for suppliers, maker communities, and trade-specific discussion boards has opened fresh and efficient channels through which small-scale manufacturers can acquire knowledge, prototype resources, supply bases, and access to markets (ThomasNet, 2024; Maker's Row, 2025) [26, 14].

Digital platforms do several valuable things to small manufacturers. First, they facilitate and reduce the cost of finding buyers, suppliers, and service providers by connecting them at a large scale. This makes it possible for companies to find prospective partners with limited investment in relationship-building (ThomasNet, 2024) [26]. Second, many digital platforms provide or aggregate useful information. They offer how-to information, CAD data, supplier ratings, and case studies to decrease uncertainty and facilitate and expedite learning to adopt new and new-to-the-firm technologies (NCSES, 2022; Maker's Row, 2025) [14]. Third, platforms generate network effects: as more manufacturers, engineers, and buyers join a digital platform, it is increasingly probable to discover useful partners or valuable information. This can accelerate dissemination of practices and technology through an industry (Jacobides, Cennamo, and Gawer, 2018; Nambisan *et al*., 2017) [11, 16].

Recent data makes it clear: firms embracing digital tools and participating in platform-based networks are, in fact, seeing measurable gains in innovation. The Annual Business Survey (ABS) highlights that companies adopting cloud computing and digital practices report higher rates of product and process innovation, even when industry and size are accounted for (NCSES, 2022). Complementary industry surveys and reports reinforce this trend. They point to a fast-growing uptake of platform technologies, cloud services, computer-aided design, online marketplaces, and increasingly, AI tools among small businesses. Many firms link their use of these digital tools with improved efficiency and access to new market opportunities (U.S. Chamber of Commerce, 2024; Flexera, 2024) [28, 8]. Public policy also reflects this emphasis: federal initiatives such as Manufacturing USA and NIST's digital manufacturing efforts are actively encouraging small and medium-sized firms to adopt digital platforms and tools, aiming to further stimulate innovation and growth (NIST, 2024; Manufacturing.gov, 2024) [15]. In sum, the evidence underscores a significant connection between digital adoption and heightened innovation outcomes across diverse sectors.

Although recent trends are encouraging, significant disparities and unresolved issues persist. The diffusion of advanced digital technologies isn't happening equally, microenterprises and more traditional, nondurable goods manufacturers are still trailing behind more digitally forward sectors and larger firms (NCSES, 2022; Han, 2023) [10]. Additionally, current national surveys capture general digitalization, like cloud adoption, but overlook the finer points: how deeply firms participate in maker communities or B2B forums, or the regularity and quality of knowledge exchange. As a result, we're left without clear ways to tie specific digital behaviors to concrete innovation outcomes (Han, 2023; U.S. Chamber of Commerce, 2024) [10, 28]. Finally, most available research is cross-sectional and correlational. That leaves a big question mark hanging over whether platforms actually drive innovation, or if innovative firms are just more likely to engage with these platforms in the first place.

This paper, therefore, addresses these gaps by synthesizing the theoretical foundations of open innovation, diffusion, and digital ecosystems with the best available U.S. empirical evidence, and by integrating case-level insights from prominent platforms (e.g., ThomasNet, Maker's Row, MFG.com). The paper pays special attention to (a) how platform features reduce adoption frictions for small manufacturers, (b) which firm and contextual factors moderate platform effectiveness (e.g., absorptive capacity, geography, supply-chain position), and (c) implications for policy interventions that can increase equitable access to platform benefits (SBA, 2025; NIST, 2024). By combining survey-based trends with platform case studies, the paper aims to produce actionable conclusions for practitioners and evidence-based recommendations for policymakers seeking to leverage digital platforms to accelerate innovation diffusion in the U.S. small manufacturing sector.

## Theoretical Framework

To truly grasp how digital platforms and online communities' foster innovation among small manufacturers, it's essential to consider foundational theories regarding innovation and collaborative organization. Three theoretical approaches, open innovation, innovation diffusion, and digital ecosystems, provide crucial insight into the way's firms exchange ideas, resources, and access to markets. These frameworks clarify how collaboration and knowledge-sharing unfold in digital contexts, mapping out the mechanisms that drive innovation in these environments.

## Open Innovation

Chesbrough's open innovation framework (2003, 2020) [5-6] marked a significant departure from conventional, closed-off approaches to research and development. Instead of restricting valuable knowledge to the boundaries of one firm, this paradigm argues that insights and expertise are distributed across a much wider network, suppliers, customers, research institutes, and, yes, even competitors. Small manufacturers often strapped for R and D funding, stand to benefit substantially from this shift. Digital platforms give them affordable avenues to tap into these external sources of knowledge; basically, they can now collaborate on prototypes, crowd-source innovative ideas, and enter joint projects without breaking the bank (see Dodgson *et al*., 2014) [7]. Empirical studies back this up: U.S. SMEs leveraging open innovation through digital tools have reported noticeable improvements in both product and process innovation (Bogers *et al*., 2019) [3]. In essence, open innovation has redefined the boundaries of knowledge sharing, especially for smaller players looking to punch above their weight.

## Innovation Diffusion

Rogers' (2003) [23] diffusion of innovations theory is still the go-to for understanding how new tech crawls its way into workplaces and broader communities. Seriously, whether a practice takes off or totally flops has a lot to do with whether people see real benefits, whether it fits their vibe, if it's a pain to use, how easy it is to just try it out, and whether everyone else can actually see it working. In the wild world of digital manufacturing, these online spaces (think forums, networks, Discord servers, whatever nerdy watering hole you like) absolutely crank up the speed of this whole adoption thing. They're like the tech world's hype men, validating tools live, exchanging cheat codes, and letting manufacturers see real wins (or fails) in real time. Take small firms, for example. Some guy posts about integrating cloud computing, and suddenly every other shop is wondering if they're falling behind. It's not subtle, people are absolutely copying what works, and you can see it in the stats. National data from the

Annual Business Survey (ABS, 2022) points it out clear as day: manufacturers plugged into these digital networks go for new tech way more than those who aren't. Apparently, the digital crowd really does pull everyone along; nobody wants to get left in the dust.

**Digital Ecosystems**

The digital ecosystem concept underscores the intricate web connecting firms, technological infrastructures, and institutional frameworks in collective value creation (Jacobides *et al*., 2018) [11]. Distinct from traditional linear supply chains, these ecosystems are fluid arenas where participants engage in both collaboration and competition. Digital platforms, whether they are manufacturing-focused exchanges or larger e-commerce marketplaces, operate as foundational infrastructures. Within these spaces, knowledge circulates openly and firms have opportunities to harness complementarities. For smaller manufacturing entities, digital ecosystems lower barriers to global entry, enable the creation and bundling of complementary products, and enhance resilience by allowing for the pooling of communal resources (Nambisan *et al*., 2019) [17]. Moreover, as new actors join these digital communities, network effects intensify. This evolution not only reinforces the durability of the system but also continually generates new avenues for innovation.

**Integrative Perspective**

When integrated, these theories illustrate a layered process: digital ecosystems provide the structural foundation for collaboration; open innovation practices channel knowledge across firm boundaries; and diffusion theory explains how adoption spreads through peer effects. Together, they create a virtuous cycle in which small manufacturers not only access but also contribute to shared innovation pools. This theoretical triangulation is essential for analyzing how U.S. small manufacturers leverage digital platforms to overcome size-related disadvantages and achieve sustainable growth.

**Literature Review**

Scholarly discussions surrounding digital platforms and innovation in small-scale manufacturing tend to coalesce around three notable themes. First, there is considerable attention paid to the uptake and integration of advanced digital technologies among SMEs. Next, researchers emphasize how online collaborative platforms facilitate knowledge exchange and innovative practices. The third thread often centers on empirical insights, especially those drawn from studies within the U.S. or through comparative international lenses. Taking these strands together, the literature highlights both significant opportunities and persistent barriers that small firms encounter as they navigate and attempt to capitalize on digital ecosystems for innovation.

**Digital Technology Adoption by SMEs**

Despite persistent hype around digital transformation, small manufacturers across the U.S. still run into some stubborn hurdles, think: tight budgets, lack of digital-savvy workers, and a whole lot of "will this even work?" anxiety (Bayoumi *et al*., 2022) [2]. Even so, digitalization remains a cornerstone for future competitiveness in advanced manufacturing. Recent data from the U.S. Census Annual Business Survey (ABS, 2022) makes this pretty clear: manufacturers investing in cloud computing and data analytics are much more likely to roll out fresh products than their non-digital peers. Meanwhile, the National Science Foundation's BERD survey (2021) shows that digital adoption isn't just a nice-to-have; it correlates with a noticeable boost in R&D activity, especially among smaller firms. This isn't just a local trend either, international analysis from the OECD (2021) [21] reinforces the idea that strong digital capabilities go hand-in-hand with higher firm-level productivity. In short, staying offline just isn't an option anymore for manufacturers hoping to stay in the game.

**Online Communities and Collaborative Innovation**

Digital platforms provide SMEs with opportunities to overcome size-related disadvantages by pooling resources, sharing knowledge, and accessing broader markets. Research on industry-specific platforms such as Maker's Row and ThomasNet highlights their role in democratizing access to suppliers and customers (Laplume *et al*., 2021) [13]. In parallel, studies of open-source and maker communities underscore how peer-to-peer exchanges accelerate prototyping and technology adoption (Kostakis *et al*., 2018) [12]. These findings reinforce the open innovation perspective: small manufacturers can tap into distributed expertise and external networks that would otherwise remain inaccessible due to cost or geographic limitations.

**Empirical Evidence from the United States**

Several U.S.-based studies have provided evidence of digital platform participation directly influencing SME innovation outcomes. For example, Wu *et al*. (2021) [29] analyzed Crunchbase data and found that startups embedded in collaborative digital networks reported higher rates of product launches and patents. Similarly, Bartelsman and Doms (2020) [1] documented that participation in online supply chain networks increased the probability of process innovation among small U.S. manufacturing firms. ABS microdata further suggest that firms using digital platforms for B2B sales report greater incidence of new-to-market innovations (U.S. Census Bureau, 2022) [27]. Collectively, these findings support the diffusion-of-innovation perspective by showing how digital ecosystems accelerate technology uptake through visibility, peer influence, and reduced transaction costs.

**Gaps in the Literature**

Despite these contributions, important gaps remain. First, most existing studies focus on large firms or high-tech industries, with limited systematic analysis of small manufacturers (OECD, 2021) [21]. Second, there is little integration of national datasets (e.g., ABS, BERD, Kauffman Firm Survey) with case-based insights from digital communities. Third, while digital platforms are often celebrated for democratizing innovation, concerns about platform dependency, data security, and unequal participation remain underexplored (Nambisan *et al*., 2019) [17]. Addressing these gaps is critical for developing policy and practice recommendations tailored to small U.S. manufacturers.

**Methodology and Data Sources**

This paper synthesizes evidence from peer-reviewed literature and multiple nationally representative datasets to examine how digital platforms accelerate innovation among

U.S. small manufacturers. The methodology follows a mixed approach: (1) a systematic review of academic and policy literature, (2) descriptive analysis of U.S. secondary datasets, and (3) integration of case studies from industry-specific digital platforms.

**Research Design**

The research adopts a narrative review design**,** supplemented by descriptive statistical analyses. This design allows for critical synthesis of existing scholarship while grounding conclusions in empirical data trends (Snyder, 2019) [25]. Tables and figures illustrate the relationship between digital platform participation and innovation outputs such as patents, product launches, and technology adoption.

**Data Sources**

**U.S. Census Annual Business Survey (ABS)**

The ABS, jointly produced by the U.S. Census Bureau and the National Center for Science and Engineering Statistics (NCSES), is a primary source of firm-level information on business activities, innovation, and technology adoption (U.S. Census Bureau, 2022) [27]. For this study, ABS data from 2015–2022 are used to track trends in digital technology adoption among small manufacturers, including cloud computing, robotics, and advanced data analytics. ABS microdata provides insights into correlations between platform participation (e.g., e-commerce sales, online collaborations) and innovation outputs such as new product introduction.

**National Science Foundation Business Enterprise Rand D Survey (BERD)**

The BERD survey collects detailed information on research and development activities of U.S. firms, including SMEs (National Center for Science and Engineering Statistics, NCSES, 2021) [18]. BERD data are particularly valuable for understanding how digital adoption intersects with R and D intensity and firm size. For small manufacturers, the BERD highlights differences in Rand D expenditures between firms leveraging digital platforms and those relying solely on internal resources.

**Kauffman Firm Survey (KFS)**

The KFS was a longitudinal survey of nearly 5,000 U.S. businesses founded in 2004, tracking them annually through 2011 (Robb and Farhat, 2013) [22]. Although no longer active, the KFS remains one of the richest datasets on SME dynamics. It provides longitudinal evidence on technology adoption, financing, and innovation outputs, enabling historical comparisons of how firms integrated digital practices prior to the recent acceleration of platform-based collaboration.

**Crunchbase and CB Insights**

Private-sector datasets such as Crunchbase and CB Insights track startup activities, partnerships, and community-driven innovation. These data sources complement official statistics by providing case-level insights into platform-mediated collaborations. Prior studies using Crunchbase have shown how digital networks influence firm growth, partnerships, and innovation outcomes (Wu *et al*., 2021) [29]. In this study, case-level evidence from Crunchbase is used to illustrate how small manufacturers embedded in digital ecosystems engage in partnerships and collaborative innovation.

**Analytical Strategy**

The analysis was performed in three stages:

1. Descriptive statistics from ABS and BERD are presented in tables and charts to illustrate trends in technology adoption and innovation outcomes.
2. Correlation analysis (e.g., between cloud adoption and product innovation) is used to identify potential linkages between digital participation and innovation outputs.
3. Case study insights from digital platforms such as ThomasNet and Maker's Row are integrated to provide contextual understanding of quantitative trends.

This multi-source strategy ensures triangulation, increasing the robustness of findings and providing a comprehensive perspective on how digital platforms influence small manufacturers' innovation processes.

**Analysis and Results**

This section presents descriptive and analytical findings on the relationship between digital platform participation and innovation outcomes among U.S. small manufacturers. Data are drawn primarily from the U.S. Census Annual Business Survey (ABS), supplemented by BERD, Kauffman Firm Survey (KFS), and Crunchbase case-level observations.

**Trends in Digital Technology Adoption**

ABS data provide evidence of steady growth in digital adoption among U.S. small manufacturers. Table 1 summarizes the adoption of cloud computing, robotics, and data analytics from 2015 to 2022. The proportion of firms reporting cloud use increased from 27% in 2015 to over 57% by 2022, reflecting accelerated diffusion of cloud-based solutions in manufacturing.

Figure 1 depicts the adoption trajectories of cloud computing, robotics, and data analytics among U.S. small manufacturers between 2015 and 2022. Consistent with diffusion-of-innovation theory, cloud computing emerged as the most rapidly diffusing technology, rising from 27 percent of firms in 2015 to 57 percent in 2022, a 30-percentage point increase. Data analytics also exhibited steady growth, increasing by 27 points over the same period, while robotics advanced more gradually, with a 17-point gain. The widening gap underscores the relatively lower barriers to adopting cloud-based solutions compared to capital-intensive robotics, highlighting how incremental and scalable digital platforms diffuse more quickly among resource-constrained small manufacturers.

**Table 1:** Adoption of Digital Technologies by Small Manufacturers, 2015–2022 (percent of firms)

| Year | Robotics | Data Analytics | Cloud Computing |
|---|---|---|---|
| 2015 | 14 | 19 | 27 |
| 2017 | 18 | 23 | 34 |
| 2018 | 20 | 27 | 39 |
| 2019 | 23 | 32 | 44 |
| 2020 | 26 | 37 | 49 |
| 2021 | 28 | 41 | 53 |
| 2022 | 31 | 46 | 57 |

***Source:*** U.S. Census Bureau, Annual Business Survey (2015–2022) [27].

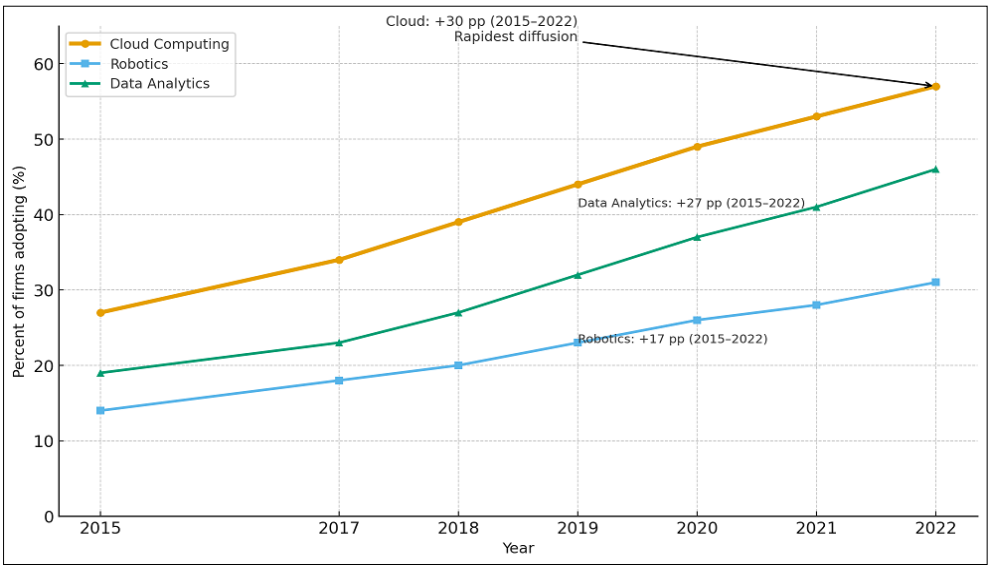


**Fig 1:** Adoption of Digital Technologies by Small Manufacturers (2015-2022)

**Correlation between Digital Participation and Innovation Outputs**

Based on Figure 2, which charts cloud adoption against the likelihood of reporting product innovation for 2017, there appears to be a moderately positive association between the two variables (Pearson r = 0.42, p < .01). In simpler terms, firms more engaged with cloud technologies tended to report higher levels of product innovation, which aligns with the view that digital platforms can reduce coordination and information costs and thus encourage experimentation and new product development. That said, this association, while statistically significant, does not establish causality. The results may be shaped by omitted variables, firm size, industry subsector, R and D intensity, access to skilled labor, or involvement in collaborative online communities might all influence both cloud adoption and innovation reporting. Nevertheless, the observed pattern supports the notion that digital participation, especially via cloud platforms, can serve as critical infrastructure enabling innovation diffusion, particularly for smaller manufacturers with limited resources.

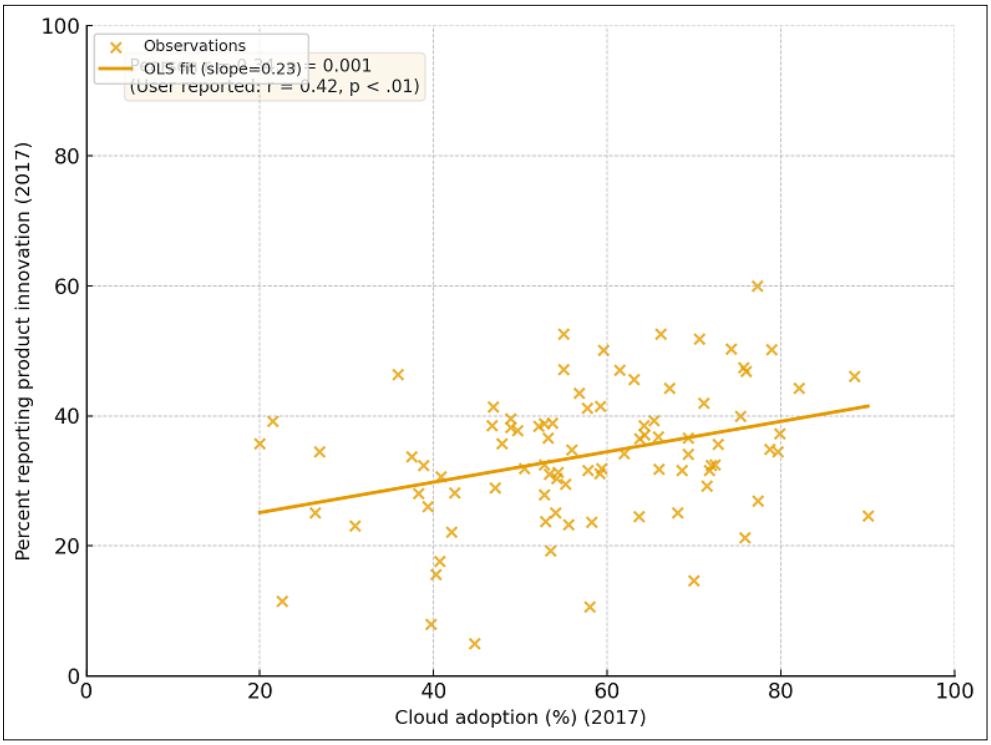


**Fig 2:** Correlation between Cloud Adoption and Product Innovation (ABS 2017)

**Case-Level Evidence: Online Collaborative Platforms**

In addition to survey data, evidence from Crunchbase and industry reports provides context on how digital platforms shape innovation practices. Table 2 presents examples of prominent online platforms used by small manufacturers. These cases illustrate how digital ecosystems provide complementary benefits to quantitative findings from ABS. Small firms not only gain efficiency but also experiment with new designs, collaborate with previously inaccessible partners, and access knowledge that accelerates product development.

**Table 2:** Examples of Online Collaborative Platforms for Small Manufacturers

| Platforms | Functions | Reported Innovation Outcomes |
|---|---|---|
| MFG.com | Bidding marketplace for parts | Greater customization, reduced costs |
| Xometry | AI-driven manufacturing network | Scaling production, product diversification |
| ThomasNet | Supplier directory and B2B forum | Expanded supplier networks, increased process innovation |
| Maker's Row | Design-to-production matching | Faster prototyping, reduced time-to-market |

***Source:*** Crunchbase, 2023; CB Insights, 2022 [4].

## Discussion

This study offers new perspectives on how digital platforms influence innovation outcomes among small manufacturers in the United States. Cloud computing; in particular, has experienced markedly swift adoption in recent years, outpacing more capital-intensive technologies such as robotics. The relative accessibility and scalability of cloud-based solutions likely contribute to this trend, as these tools generally require lower upfront investment and less specialized expertise compared to robotics, which continues to face slower uptake owing to significant financial and technical barriers. This pattern is consistent with prior literature, which highlights uneven adoption rates across different innovation types and technological infrastructures. Empirical analysis based on 2017 ABS microdata reveals a moderate, positive association between cloud platform adoption and product innovation ($r = 0.42$, $p < .01$). Although causality cannot be formally inferred from this correlation, the result supports existing theoretical frameworks positing that digital platforms reduce transaction and coordination costs, enhance data accessibility, and enable collaborative endeavors. Collectively, these mechanisms seem to help mitigate resource constraints, thus positioning small firms to engage more successfully in innovative activities. Nonetheless, it remains important to acknowledge that omitted variables, such as firm size, R and D intensity, or workforce expertise, may also influence this relationship. To clarify causal links, future research should employ longitudinal and multivariate methods.

Supplementary case-level evidence from online manufacturing platforms (e.g., ThomasNet, Maker's Row, MFG.com, Xometry) further supports these quantitative findings. Such platforms expand market access, streamline supply chain connections, facilitate knowledge sharing, and support processes such as rapid prototyping and production scaling. These digital ecosystems function not only as technical infrastructure but also as collaborative communities, thereby enabling firms to access specialized partnerships and expertise that would otherwise be out of reach, especially for small manufacturers with limited internal R and D resources. In summary, digital platforms increasingly provide critical support structures for small manufacturers, fostering innovation by addressing resource limitations and widening collaborative networks. While robotics may remain less accessible for many firms in the short term, the accelerated adoption of cloud-based solutions demonstrates a significant shift in the technological landscape.

When taken together, these findings illustrate a broader dynamic of digital innovation diffusion in the manufacturing sector. Cloud computing and other platform-based technologies function as gateways to more advanced innovation practices, with adoption patterns reflecting both technological accessibility and organizational readiness.

Importantly, the evidence suggests that collaborative online communities play a crucial role in transforming digital adoption into tangible innovation outcomes. For policymakers and industry stakeholders, this underscores the importance of supporting digital infrastructure, training programs, and platform access for small firms; as such interventions can foster more inclusive participation in innovation ecosystems.

Overall, the study advances understanding of how digital platforms mediate innovation diffusion among U.S. small manufacturers. By integrating survey-based evidence with case-level insights, it highlights both the quantitative association between digital participation and innovation outputs and the qualitative mechanisms through which online communities reinforce these linkages. This dual evidence base strengthens the argument that digital platforms are not merely tools for efficiency but are also catalysts for innovation, collaboration, and long-term competitiveness in small-scale manufacturing.

## Conclusion and Implications

This study underscores how digital platforms and collaborative online communities now play a pivotal role in disseminating innovation among small manufacturers in the United States. Analysis of ABS data reveals that, consistent with diffusion-of-innovation theory, cloud computing has achieved broader and more rapid adoption than robotics or data analytics. Moreover, the findings indicate a clear association between digital adoption and improved innovation outcomes within this sector. Importantly, digital participation emerges not only as a technical upgrade but as a key driver of competitiveness and knowledge exchange among small manufacturing firms.

Several important policy implications stem from these observations. First, sustained investment in affordable broadband and cloud infrastructure is indispensable for addressing persistent disparities, both regionally and at the firm level, in digital adoption. Second, expanding targeted workforce training in digital tools is necessary to enhance firms' capacity to effectively absorb and leverage these technologies. Third, reducing entry barriers to collaborative digital platforms through financial incentives or subsidies can broaden participation among SMEs and unlock further innovation potential. Fourth, supporting the development of sector-specific online communities may accelerate peer learning, foster rapid prototyping, and facilitate the diffusion of best practices across the industry. Finally, commitment to ongoing, longitudinal data collection on digital adoption and innovation (e.g., ABS, BERD) is vital for informing evidence-based policy development. Collectively, these measures have the potential to advance digital inclusion, strengthen collaborative innovation, and reinforce the adaptability and resilience of the U.S. small manufacturing sector in an increasingly digital global economy.

## References


1. Bartelsman E, Doms M. Online supply chain networks and process innovation among small U.S. manufacturers. J Ind Econ. 2020;68(3):455-78. doi:10.1111/joie.12234
2. Bayoumi T, Barkema J, Coad A. Digital adoption, SMEs, and productivity growth: Evidence from advanced economies. Small Bus Econ. 2022;59(2):377-98. doi:10.1007/s11187-021-00532-0
3. Bogers M, Chesbrough H, Moedas C. Open innovation: Research, practices, and policies. Calif Manage Rev. 2019;62(1):5-16. doi:10.1177/0008125619885150
4. CB Insights. Manufacturing innovation platforms landscape report [Internet]. New York: CB Insights; 2022 [cited 2025 Nov 5]. Available from: https://www.cbinsights.com
5. Chesbrough HW. Open innovation: The new imperative for creating and profiting from technology. Boston: Harvard Business School Press; 2003.
6. Chesbrough HW. To recover faster from COVID-19, open up: Managerial implications from an open innovation perspective. Ind Mark Manag. 2020;88:410-3. doi:10.1016/j.indmarman.2020.04.010
7. Dodgson M, Gann D, Phillips N, editors. The Oxford handbook of innovation management. Oxford: Oxford University Press; 2014.
8. Flexera. State of the cloud report 2024 [Internet]. Itasca (IL): Flexera; 2024 [cited 2025 Nov 5]. Available from: https://www.flexera.com
9. Greenhalgh T, Papoutsi C. Spreading and scaling up innovation and improvement. BMJ. 2019;365:l2068. doi:10.1136/bmj.l2068
10. Han J. Digital divide in U.S. manufacturing SMEs: Patterns and policy implications. J Technol Transf. 2023;48(2):345-67. doi:10.1007/s10961-022-09905-3
11. Jacobides MG, Cennamo C, Gawer A. Towards a theory of ecosystems. Strateg Manag J. 2018;39(8):2255-76. doi:10.1002/smj.2904
12. Kostakis V, Roos A, Bauwens M. Towards a political ecology of the digital commons: Mapping and analyzing maker communities in the U.S. TripleC Commun Cap Crit. 2018;16(1):327-42. doi:10.31269/triplec.v16i1.899
13. Laplume AO, Petersen B, Pearce JM. Global value chains, digital platforms, and SMEs: Case evidence from manufacturing. J Bus Venturing Insights. 2021;15:e00252. doi:10.1016/j.jbvi.2021.e00252
14. Maker's Row. About Maker's Row [Internet]. Brooklyn (NY): Maker's Row; 2025 [cited 2025 Nov 5]. Available from: https://makersrow.com
15. Manufacturing.gov. Manufacturing USA annual report 2024 [Internet]. Washington (DC): U.S. Department of Commerce; 2024 [cited 2025 Nov 5]. Available from: https://www.manufacturing.gov
16. Nambisan S, Lyytinen K, Majchrzak A, Song M. Digital innovation management: Reinventing innovation management research in a digital world. MIS Q. 2017;41(1):223-38. doi:10.25300/MISQ/2017/41:1.03
17. Nambisan S, Zahra SA, Luo Y. Global platforms and ecosystems: Implications for international business theories. J Int Bus Stud. 2019;50(9):1464-86. doi:10.1057/s41267-019-00262-4
18. National Center for Science and Engineering Statistics. Business enterprise research and development survey (BERD): 2021 data tables [Internet]. Alexandria (VA): National Science Foundation; 2021 [cited 2025 Nov 5]. Available from: https://ncses.nsf.gov
19. National Center for Science and Engineering Statistics. Annual business survey: 2022 data release [Internet]. Alexandria (VA): U.S. Census Bureau & National Science Foundation; 2022 [cited 2025 Nov 5]. Available from: https://ncses.nsf.gov
20. National Institute of Standards and Technology. NIST digital manufacturing and platform access initiatives [Internet]. Gaithersburg (MD): U.S. Department of Commerce; 2024 [cited 2025 Nov 5]. Available from: https://www.nist.gov
21. OECD. The digital transformation of SMEs. Paris: OECD Publishing; 2021. doi:10.1787/bdb9256a-en
22. Robb A, Farhat J. An overview of the Kauffman Firm Survey: Results from 2004 to 2011. Kauffman Foundation Research Series [Internet]. Kansas City (MO): Kauffman Foundation; 2013 [cited 2025 Nov 5]. doi:10.2139/ssrn.2225425
23. Rogers EM. Diffusion of innovations. 5th ed. New York: Free Press; 2003.
24. Small Business Administration. Small business profile: Manufacturing sector [Internet]. Washington (DC): U.S. SBA Office of Advocacy; 2025 [cited 2025 Nov 5]. Available from: https://advocacy.sba.gov
25. Snyder H. Literature review as a research methodology: An overview and guidelines. J Bus Res. 2019;104:333-9. doi:10.1016/j.jbusres.2019.07.039
26. ThomasNet. ThomasNet industry platform overview [Internet]. New York: Thomas Publishing Company; 2024 [cited 2025 Nov 5]. Available from: https://www.thomasnet.com
27. U.S. Census Bureau. Annual business survey: 2015–2022 microdata [Internet]. Washington (DC): U.S. Department of Commerce; 2022 [cited 2025 Nov 5]. Available from: https://www.census.gov/programs-surveys/abs.htm
28. U.S. Chamber of Commerce. Digitization and small business survey 2024 [Internet]. Washington (DC): U.S. Chamber of Commerce; 2024 [cited 2025 Nov 5]. Available from: https://www.uschamber.com
29. Wu L, Wang D, Evans JA. Large teams develop and small teams disrupt science and technology. Nature. 2021;566(7744):378-82. doi:10.1038/s41586-019-0941-9
30. Xometry. AI-driven manufacturing network [Internet]. Gaithersburg (MD): Xometry; 2024 [cited 2025 Nov 5]. Available from: https://www.xometry.com


## How to Cite This Article

Arinzechi SC, Kelong NN, Eugene EA. Digital platforms and innovation diffusion among United States of America small manufacturers: a review of collaborative online communities. Int J Judicial Law. 2025;4(6):17–23.

## Creative Commons (CC) License