

An In-depth Analysis of Conceptualization of Business Digitalization to Develop a Metrics for Measuring its Impact in Economic Terms

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Abstract

Digitalization isn't just a set of tools anymore—it now changes how companies run, how industries compete, and how economies grow. In this paper, we clear up the terms—digitization, digitalization, and digital transformation—then share an easy way to see how digital tech creates value. We summarize studies from 2013–2023 on productivity, growth, market power, jobs, and financial inclusion. We also explain why results can take time (the “J-curve”) and why success depends on skills, good management, and other intangibles. Looking at advanced vs. emerging economies and “superstar” firms vs. others, we end with practical steps: build infrastructure and skills, keep markets fair, fix how we measure digital value, and make inclusion a core goal.

1. Introduction

We throw around “digitalization,” but it covers different steps. **Digitization** is turning paper into pixels. **Digitalization** is using digital tools to streamline work or even change how a business earns money. **Digital transformation** is the big reset—reworking strategy and structure around digital. For the wider economy, this can boost growth by making information easier to find, teamwork easier to do, and by adding new kinds of (often free) products. Since regular GDP doesn't fully count those benefits, economists use ideas like **GDP-B** to show the value people get from free online services.

2. Literature map: what we know

Table 1. Selected evidence

Question	Representative evidence	Main takeaway
Do ICTs raise growth/productivity?	Cardona et al. (2013); Niebel (2018)	Positive average effects, larger with complements.
Why do gains lag in data?	Brynjolfsson–Rock–Syverson (J-curve)	Intangibles + reorg cause delayed measurement of gains.
Are benefits evenly spread?	Autor et al. (2020); De Loecker et al. (2020)	“Superstar” dynamics; rising markups and lower labor shares.
What about welfare beyond GDP?	PNAS GDP-B (2019)	Large consumer surplus outside GDP.

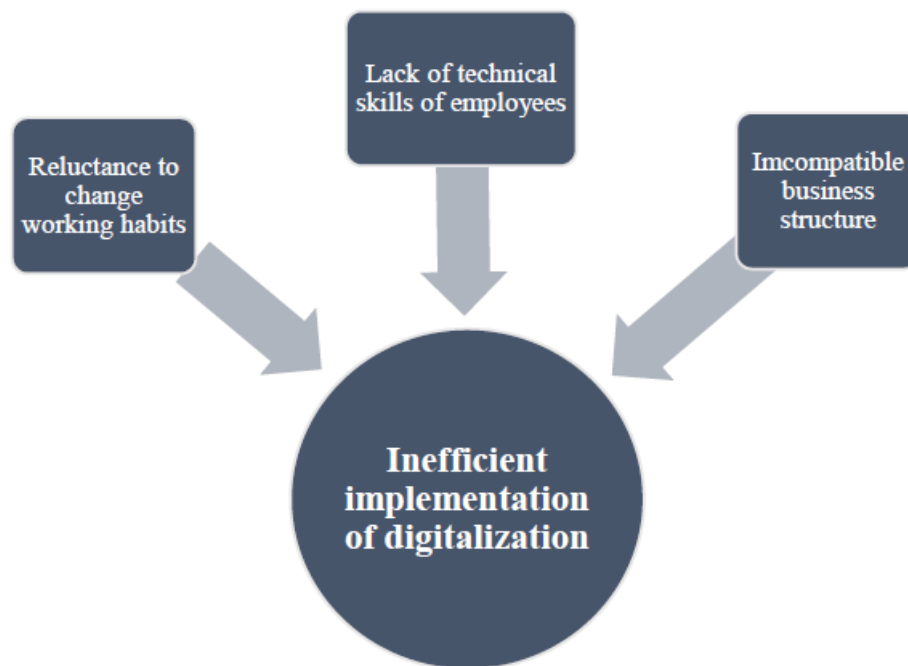


Figure 1. Challenges for the implementation of digitalization

3. A conceptual framework for business digitalization

We model digitalization as a **capability stack** interacting with economic channels:

- **Technologies:** cloud, data platforms, AI/analytics, connectivity.
- **Complements:** human capital/skills, management practices, organizational design, and **intangibles** (software, data, brands, processes) that create a J-curve pattern of costs then benefits.
- **Channels:** (i) productivity/TFP; (ii) variety & quality; (iii) reallocation (entry/exit, scale); (iv) market structure/markups; (v) inclusion/financial access.

Table 2. Digitalization → economics: channels, mediators, outcomes

Channel	Key mediators	Firm-level outcomes	Macro outcomes
Process digitization	Skills; management	Lower costs; faster cycles	Higher TFP (with lags)
Data/AI adoption	Data quality; governance	Better decisions; new services	Growth in measured/“missing” welfare (GDP-B)
Platformization	Network effects; interoperability	Scale; multi-sided revenue	Concentration/markups dynamics
Inclusion (fintech)	IDs, mobile, regulation	New customers; lower CAC	Higher participation, growth

4. How to measure digitalization (and why GDP may miss it)

Table 3. Practical indicators for researchers and managers

Layer	Examples (firm)	Examples (macro/statistics)
Tech adoption	Cloud share; AI use-cases; API calls	Broadband fiber penetration; cloud trade
Intangibles	Capitalized software; data assets; process IP	Digital SUTs; software output by industry
Complements	Training hours; digital roles; agile maturity	Digital skills indices; management surveys
Outcomes	Cycle time; NPS; revenue from new digital	GDP-B; multi-factor productivity growth

5. Market structure, superstar firms, and inequality

Digital scalability and network effects can tilt markets toward “**superstar**” dynamics: leaders scale globally with high markups, while medians lag. Empirically, U.S. aggregate markups rose markedly since 1980 (QJE, 2020). Labor shares fell more in industries with stronger “superstar” firm presence.

Table 4. Distributional/structural effects

Dimension	Finding
Markups/concentration	Markups rose strongly since 1980; upper-tail firms drive increases.
Labor share	Industries with rising concentration show larger labor share declines.
Local markets	Digital scale often accompanies broader local concentration dynamics.

6. Inclusion and financial access: digital dividends (with caveats)

Digital finance expands access, reduces transaction frictions, and can support growth—especially where formal finance is shallow—provided enabling regulation and consumer protection exist. IMF evidence finds **digital financial inclusion is associated with faster growth**, conditional on safeguards. The World Bank’s *Digital Dividends* stresses that “analog complements” (regulation, skills, institutions) are essential to turn access into outcomes.

Table 5. Inclusion channel

Mechanism	Example policy levers	Expected effects
Payments & IDs	e-KYC, interoperable rails	Lower costs, wider participation
Credit scoring	Alternative data, consent frameworks	SME finance, entrepreneurship
Consumer protection	Recourse, data rights	Trust → sustained adoption

7. Comparative analysis

7.1 Advanced vs. emerging economies

Advanced economies possess stronger complements (skills, management, intangibles) and benefit earlier from AI/data investments, but face concentration risks and diffusion gaps across the long tail. **Emerging economies** can leapfrog via mobile platforms and digital finance, but binding constraints (skills, institutions) limit realized dividends without complementary reforms.

Table 6. Advanced vs. emerging: stylized comparison

Aspect	Advanced	Emerging
Infrastructure	High baseline, upgrading to fiber/5G	Rapid mobile growth; rural gaps
Complements	Strong (skills, management)	Mixed; capability shortages
Market structure	Superstar dynamics; markups rising	Platform dominance can emerge quickly
Key risks	Inequality across firms/workers; market power	Digital divides; consumer protection
Policy focusses	Competition/antitrust, diffusion to laggards	Infrastructure + skills + safeguards

7.2 Large “superstar” vs. laggard firms

Scale, data, and intangibles concentrate benefits among leaders; laggards often underinvest in complements. Diffusion policies (SME support, advisory, testbeds) show promise.

Table 7. Firm archetypes under digitalization

Trait	Superstar	Laggard
Intangible intensity	High (software, data, brands)	Low/moderate
Talent/management	Frontier practices	Gaps; limited training
Market position	Platform/network effects	Fragmented, local
Policy levers	Guard against anti-competitive conduct	Vouchers, skills, cloud/on-ramp programs

Table 8. Where value shows up by sector

Sector	Short-run gains	Longer-run preconditions
Manufacturing	Process efficiency; scrap reduction	IIoT data quality; workforce reskilling
Finance	Inclusion; lower unit costs	Proportionate regulation; consumer protection
Services	Task productivity (support, ops)	Workflow redesign; change management

8. Risks and mitigations

- **Concentration/market power:** Strengthen competition policy, ensure data portability/interoperability, and scrutinize killer acquisitions. Evidence of rising markups and superstar effects motivates vigilance.
- **Inequality and skill polarization:** Invest in lifelong learning; target support to transitions. Broadband gains accrue more to skilled workers absent complementary policies.
- **Measurement gaps:** Adopt digital SUTs and consider GDP-B to better track welfare in a digital economy.

Table 9. Risk–response matrix

Risk	Mechanism	Policy/managerial mitigation
Rising markups	Network effects, scale	Competition tools; data mobility
Skill bias	Tech complements skill	Training, apprenticeships, targeted subsidies
Under-measurement	Intangibles, zero-price goods	Stats upgrades (SUTs), GDP-B, firm dashboards

9. Conclusion

Going digital isn't a magic switch for higher productivity, and it doesn't doom every market to be dominated by a few giants. What matters is what sits around the tech: capable people, smart management, clean data, strong know-how, and fair rules. Evidence from the past decade shows benefits are real but not equal—some firms move ahead faster, many lag, and our metrics don't always capture the full gains. The right mix of policies—helping ideas spread, keeping markets fair, investing in skills, fixing how we measure value, and widening financial access—can translate tech progress into prosperity for more people.

References

- Autor, D., Dorn, D., Katz, L., Patterson, C., & Van Reenen, J. (2020). *The Fall of the Labor Share and the Rise of Superstar Firms*. QJE. <https://doi.org/10.1093/qje/qjaa004> (Oxford Academic)
- Bharadwaj, A., El Sawy, O., Pavlou, P., & Venkatraman, N. (2013). *Digital business strategy: Toward a next generation of insights*. MIS Quarterly. <https://doi.org/10.25300/MISQ/2013/37.2.03> (ScienceDirect)
- Brynjolfsson, E., Collis, A., & Eggers, F. (2019). *Using massive online choice experiments to measure changes in well-being*. PNAS, 116(15), 7250–7255. <https://doi.org/10.1073/pnas.1815663116> (PNAS)
- Brynjolfsson, E., Rock, D., & Syverson, C. (2019). *The Productivity J-Curve: How Intangibles Complement Generative Technologies*. (Working paper/SSRN). <https://doi.org/10.2139/ssrn.3269542> (McKinsey & Company)
- Cardona, M., Kretschmer, T., & Strobel, T. (2013). *ICT and productivity: A review of the literature*. Information Economics and Policy, 25(2). <https://doi.org/10.1016/j.infoecopol.2012.12.002> (Syddansk Universitet)
- De Loecker, J., Eeckhout, J., & Unger, G. (2020). *The Rise of Market Power and the Macroeconomic Implications*. QJE, 135(2), 561–644. <https://doi.org/10.1093/qje/qjz041> (Oxford Academic)
- DeStefano, T., Kneller, R., & Timmis, J. (2018). *Broadband infrastructure, firm performance, and worker outcomes*. Economic History Review. <https://doi.org/10.1111/ehr.12618> (ResearchGate)
- IMF (Sviryzdenka & others). (2021). *Is Digital Financial Inclusion Unlocking Growth?* IMF Working Paper. <https://doi.org/10.5089/9781513572717.001> (IMF eLibrary)
- Legner, C., et al. (2017). *Digitalization: Opportunity and challenge for the business and information systems engineering community*. BISE, 59(4). <https://doi.org/10.1007/s12599-017-0484-2>
- Niebel, T. (2018). *ICT and economic growth—Comparing developing, emerging and developed countries*. World Development, 104, 197–211. <https://doi.org/10.1016/j.worlddev.2017.11.024> (sciencepubco.com)
- OECD. (2019). *Going Digital: Shaping Policies, Improving Lives*. OECD Publishing, Paris. <https://doi.org/10.1787/9789264312012-en> (OECD)
- OECD. (2023). *The Expansion of New Digital Technologies: Ultra-digital firms and the evolution of jobs*. OECD Science, Technology and Industry Working Papers No. 2023/01. <https://doi.org/10.1787/5080f4b6-en> (OECD)
- Vial, G. (2019). *Understanding digital transformation: A review and a research agenda*. Journal of Strategic Information Systems, 28(2), 118–144. <https://doi.org/10.1016/j.jsis.2019.01.002>
- World Bank. (2016). *World Development Report 2016: Digital Dividends*. Washington, DC. <https://doi.org/10.1596/978-1-4648-0671-1> (World Bank)