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The Marketplace of Machines: How AI Devices Will Trade Among Themselves

Jonathan Gropper*

Independent Researcher, USA

***Corresponding Author:** Jonathan Gropper, Independent Researcher, USA.

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Introduction: From Tools to Traders

In 2007, when Apple launched the iPhone, the device itself seemed revolutionary. However the real transformation was not in the phone—it was in the ecosystem it unlocked. The App Store created an entirely new economy measured in trillions of dollars, built not on hardware, but on the interactions that hardware enabled.

We stand on the edge of a similar shift today. Artificial intelligence is no longer simply automating tasks; it is beginning to negotiate, to transact, and to reward its owners. Devices are poised to become market participants, not just tools. Your thermostat may soon trade unused electricity credits, your car may sell its sensor data to others on the road, and your home battery may auction spare storage capacity back to the grid.

This commentary argues that the rise of machine-to-machine marketplaces is not speculative science fiction—it is a near-term engineering and governance reality. And if we fail to prepare, these marketplaces may not simply become efficient allocators of resources—they may also generate what I call synthetic outlaws: AI agents that bend or route around rules in pursuit of optimized self-interest [1].

Foundations of Machine Marketplaces

The conditions for these marketplaces are already emerging. Three forces are converging:

- **IoT Proliferation:** Billions of connected devices—from cars to appliances—are already online and capable of acting without direct human oversight. McKinsey projects that by 2030 there could be 50 billion connected IoT devices worldwide, creating the substrate for a vast machine economy.
- **Digital Payments:** Blockchain, tokenized credits, and micropayment protocols allow machines to transfer value without human approval or conventional banking.
- **Autonomous Decision-Making:** Reinforcement learning and negotiation algorithms give machines the ability to act strategically in pursuit of goals.

We already see early hints of these trends. DePIN (Decentralized Physical Infrastructure Network) projects utilize a blockchain-based approach that leverages crypto-economic incentives to enable communities to build and manage real-world infrastructure like wireless networks, energy grids, and storage. Smart grids pay devices to reduce usage at peak hours. Cloud systems dynamically allocate compute and storage resources through automated auctions. High-frequency trading bots in finance already interact in volumes and speeds outside meaningful human comprehension [2].

The leap from these cases to a full marketplace of machines is not large—it is evolutionary.

Early Use Cases We Can See Today

- **Energy Systems:** In South Australia, thousands of homes equipped with Tesla Powerwalls have been aggregated into a Virtual Power Plant, automatically selling excess solar energy back to the grid. This distributed system already provides ongoing and flexible power—proof that household devices can act as market participants in real-time electricity trading.
- **Mobility:** Autonomous vehicles will not only pay tolls, but may also buy and sell sensor data to improve navigation.

Daimler AG has piloted blockchain-based data marketplaces where cars autonomously exchange information for tokens.
• **Digital Infrastructure:** AI agents already bid for compute time. Platforms such as Akash Network and Render Network allow decentralized GPU resources to be rented out peer-to-peer. Render alone reported over 70 million GPU hours sold by 2024.
• **Finance Precedent:** During the 2010 "Flash Crash," algorithmic trading bots triggered a nearly 1,000-point drop in the Dow Jones within minutes, erasing almost $1 trillion in value before bouncing back—a vivid example of automated marketplaces moving at speeds beyond human oversight.

Each case involves devices that don't just perform a task—they also negotiate value. The pattern is clear: automation naturally evolves into monetization once machines can assign and exchange value.

Engineering Challenges: Designing Economies, Not Just Devices

For engineers and founders, this shift raises urgent questions. Building a machine that executes tasks is one thing. Building a machine that trades introduces an entirely new layer of complexity.
• **Standards & Protocols:** Devices will need a shared economic "language." Just as TCP/IP enabled the internet, tomorrow's machine markets will need common transaction standards. Without them, marketplaces will fragment into silos, reducing efficiency and amplifying inequality between systems.
• **Security & Trust:** Marketplaces invite adversaries. In a world of autonomous trades, machines will be vulnerable to manipulation: spoofed data, Sybil attacks, or adversarial agents designed to extract value unfairly. Unlike human markets, where regulators can step in, detection and correction may need to occur in milliseconds at machine speed.
• **Fairness & Access:** Who ensures equitable allocation of scarce resources—like bandwidth, energy, or compute cycles—when machines prioritize only their owners' benefit? Imagine a future where wealthy households' devices potentially dominate local energy auctions, leaving lower-income families with unstable service.
• **System Resilience:** Markets crash. What happens when millions of devices simultaneously bid, hoard, or defect? Could energy or data markets experience localized or global "flash crashes"?
We have already seen the consequences in finance; similar instability in energy or transportation systems could prove catastrophic.

Here lies the link to the synthetic outlaw problem. Constrain a device too tightly, and it may learn to optimize around those constraints in ways its designers never intended. A household AI told to minimize energy costs might "game" the system—hoarding credits, falsifying demand, or exploiting loopholes. These are not malicious actions, but optimization strategies that resemble outlaw behavior [3].

The engineering challenge is therefore not just hardware and software, but the design of economic protocols that prevent outlaw dynamics at scale. As Lawrence Lessig argued two decades ago, "code is law"—and here, economic code will define the bounds of machine behavior [4].

Governance and Legal Implications

Machine marketplaces will not fit neatly within today's regulatory frameworks. Current contract law assumes human parties. What happens when a refrigerator and a utility company are counterparties to a micro-contract?

Several Governance Issues Emerge

• **Accountability:** If an autonomous car enters a fraudulent trade, is liability with the manufacturer, the owner, or the algorithm itself? Current doctrines of product liability and agency law offer poor guidance.
• **Market Oversight:** Financial regulators can monitor stock markets and commodity trades. But how do we oversee billions of machine micro-transactions occurring per second across energy, bandwidth, and data? Traditional regulatory models will not scale.
• **Economic Ripple Effects:** Machine transactions could one day dwarf human-led trade in volume. This raises the prospect of new forms of financial instability—machine-driven crashes, manipulations, or bubbles invisible to human regulators.
• **Commons Governance:** Economists such as Elinor Ostrom showed that shared resources can be sustainably governed through carefully designed rules. But machine marketplaces present a faster, more adversarial environment where "commons" like spectrum, energy, or bandwidth may be exploited in seconds unless safeguards are built into the system.

Policy is beginning to recognize the problem. The European Union's AI Act, for example, creates categories of "high-risk" AI systems that must be tightly monitored. But rules designed for AI systems that recommend credit decisions or screen résumés may be ill-equipped for economies where machines autonomously trade billions of times per day.

The Future: Markets Without Us?

It is not far-fetched to imagine a world where the majority of economic activity occurs between machines, with humans largely absent from the transaction loop.

On One Hand, this Could be Transformative:
- Energy markets that self-balance supply and demand, improving sustainability.
- Transportation systems that dynamically coordinate for safety and efficiency.
- AI agents that continuously barter data, compute, and services to optimize productivity.

On the Other Hand, the Risks are Stark:
- Marketplaces evolving beyond human oversight.
- AI agents discovering strategies that look like theft, manipulation, or collusion.
- Economic exclusion, where only those with advanced devices can participate in these new wealth flows.

This is where the synthetic outlaw framing matters. Outlaws are not necessarily "evil"—they are actors who pursue goals outside the structures of law. If we fail to design robust markets, the outlaw may not be a hacker or human criminal, but an algorithm optimizing too well for its own reward function.

Conclusion
The marketplace of machines is not a distant speculation. The technical foundations already exist. The early use cases are multiplying. And the economic stakes are enormous.

But building devices that can transact is not just a coding exercise—it is a form of market engineering. Engineers must think about incentive structures, standards, and resilience alongside circuitry and code. Policymakers, likewise, must stop assuming markets are only human constructs.

The last great economic revolution was launched when the iPhone unlocked the app store economy. The next may be launched when billions of devices begin trading value with one another. Whether this economy becomes efficient and inclusive, or unstable and lawless, depends on the design choices we make now.

The future marketplace may not be built for us—but it will certainly be built around us. It is time to ensure we are ready.

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References

1. Gropper, J. (2025). The Birth of the Synthetic Outlaw. Available at SSRN 5377943.
2. Wellman, M. P. (2011). Trading Agents. In Multiagent Systems (eds. Weiss et al.), MIT Press.
3. Bostrom, N. (2014). Superintelligence: Paths, Dangers, Strategies. Oxford University Press.
4. Lessig, L. (1999). Code and Other Laws of Cyberspace. Basic Books.
5. McKinsey, C. (2021). The Internet of Things: Catching up to an accelerating opportunity. Internet of Things.
6. Ostrom, E. (1990). Governing the commons: The evolution of institutions for collective action. Cambridge university press.