Decentralized Mechanism Design for Self-Selected Goals in Crowdsourcing Systems

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Abstract

Crowdsourcing platforms mediate the exchange of labor, knowledge, and creativity at global scale, yet their centralized design concentrates governance in the hands of platform operators, often misaligning the objectives of workers, requesters, and the broader socio-technical ecosystem. This paper explores the conceptual architecture, incentive properties, and systemic implications of decentralized mechanism design that empowers workers to self-select their performance goals. Rather than imposing extrinsic rewards or algorithmic control exclusively from the top down, a decentralized framework embeds goal selection within a transparent, verifiable, and participatory governance layer. We analyze how such self-selected goal mechanisms can be realized through distributed ledger technologies, smart contracts, and reputation-based consensus protocols, and we examine the structural trade-offs that arise around incentive compatibility, collusion resistance, fairness, and quality assurance. The discussion bridges mechanism design theory, empirical findings on gig worker behavior, and emergent practices in decentralized autonomous organizations, highlighting the delicate balance between individual autonomy and system-wide robustness. Special attention is given to deployment challenges, including scalability under dynamic participation, the cost of on-chain computation, and the regulatory uncertainty surrounding algorithmic governance and labor classification. The paper further evaluates the policy dimensions of encoding work norms into immutable protocols and the sustainability of platforms that distribute authority over task allocation and reward distribution. We argue that integrating self-selected goals into decentralized mechanism design constitutes a promising pathway toward more equitable, resilient, and adaptive crowdsourcing infrastructures, but it demands careful institutional design to prevent new forms of exclusion and manipulation. The analysis contributes a forward-looking research agenda at the intersection of distributed systems, algorithmic economics, and platform governance.

Keywords

mechanism design, crowdsourcing, decentralization, self-selected goals, governance, fairness.

1. Introduction

Crowdsourcing has matured into a foundational infrastructure for digital labor, encompassing microtask platforms, innovation contests, citizen science initiatives, and on-demand service marketplaces. The architecture of these systems has historically been centralized, with platform operators defining task interfaces, reward structures, reputation metrics, and dispute resolution processes. While such centralization enables rapid iteration and consistent user experience, it also introduces profound power asymmetries and informational bottlenecks that distort market efficiency and undermine participant welfare. A growing body of scholarship has diagnosed these tensions, documenting how algorithmic management can arbitrarily deactivate workers, how opaque rating systems amplify bias, and how unilateral fee adjustments erode trust [1]. At the same time, the labor economics of paid crowdsourcing reveals that participants exhibit sophisticated strategic behaviors in response to reward schemes, often leading to outcomes that deviate from platform objectives when incentives are poorly designed [2]. Consequently, mechanism design has become a central intellectual tool for aligning the interests of distributed agents with system-level goals.

Classical mechanism design in crowdsourcing has focused on eliciting truthful effort reports, optimizing task assignment, and guaranteeing budget feasibility under various informational constraints [3]. These approaches, however, assume the presence of a trusted central designer who enforces the rules and processes payments. The emergence of decentralized ledger technologies has challenged this assumption by making it technically feasible to encode mechanism rules into smart contracts and to enforce them through consensus among distributed validators without a single governing entity [4]. Decentralized mechanism design thus shifts the locus of control from a platform operator to a protocol, promising greater transparency, censorship resistance, and user sovereignty. Yet decentralization alone does not automatically yield fairness or efficiency; the underlying economic logic must be carefully restructured to function in an environment where participants may collude, network latency introduces timing games, and the computational cost of on-chain operations constrains mechanism complexity.

One particularly underexplored dimension of decentralized mechanism design is the role of self-selected goals. In conventional crowdsourcing, targets such as task completion quotas, accuracy thresholds, or response times are typically set by the requester or the platform. Recent empirical work, however, demonstrates that when gig workers choose their own goals—for instance, daily earnings targets or weekly task volumes—their motivation, persistence, and quality of output shift in measurable ways [5]. This finding suggests that embedding self-selected goal mechanisms into the protocol layer of a decentralized crowdsourcing system could harness intrinsic and self-regulatory drivers while preserving alignment with collective quality standards. The present paper develops a conceptual framework for such a design, examining how decentralized architectures can accommodate worker-driven goal parameters, what new incentive and governance challenges arise, and what systemic trade-offs must be navigated. We adopt a systems-level perspective, integrating insights from distributed computing, algorithmic game theory, organizational economics, and platform policy.

2. Background and Related Work

Understanding the confluence of decentralized architectures and self-selected goals requires revisiting foundational findings on incentive structures in crowdsourcing, the evolution of blockchain-based coordination mechanisms, and the behavioral science of personal goal setting. Early large-scale studies of crowd work identified that workers are far from passive executors; they dynamically select tasks, manage portfolios of activities, and adjust effort in response to payment schemes, task framing, and social comparisons [1], [2]. Mechanism design research responded by formulating auction-based, contest-based, and peer-prediction mechanisms that elicit truthful effort without centralized monitoring, often relying on Bayesian Nash equilibrium refinements to ensure incentive compatibility [3]. These models, however, have been expressed primarily in mathematical terms that assume a single, all-powerful center capable of computing and enforcing the mechanism's outcome function.

The transition to decentralized mechanisms gained momentum with the demonstration that complex economic rules can be embedded into smart contracts on public blockchains, enabling trustless coordination among mutually distrusting participants [4]. Decentralized crowdsourcing frameworks such as ZebraLancer introduced privacy-preserving task matching and reward distribution without a central server, illustrating that core operations of a labor market can be executed on-chain. Subsequent research extended these foundations by integrating reputation tokens, staking, and dispute resolution via decentralized oracle networks, creating what are effectively autonomous labor protocols. Despite these technical advances, much of the literature on decentralized mechanism design has retained the assumption that task objectives and performance criteria are given exogenously, either by a requester or by a predefined algorithmic policy. The idea that workers themselves could select goal thresholds and have those choices integrated into the mechanism's state remains largely unexplored.

Parallel to these developments, the behavioral and managerial sciences have produced robust evidence that self-set goals influence performance across a wide range of work environments. In the context of digital gig work, a recent field experiment showed that allowing workers to set personal earnings or task-count goals altered their labor supply decisions, increased persistence on difficult assignments, and affected output quality in nuanced ways [5]. This study underscores that goal choices are not mere reflections of stable preferences but are shaped by framing, feedback, and social comparison channels—factors that can be deliberately designed into a system's interface and incentive logic. When translated into a decentralized mechanism, self-selected goals introduce a new strategic variable: workers must anticipate how their chosen goals will interact with peer behavior, reputation scoring, and automated reward distribution, creating a rich space for equilibrium analysis and system tuning.

3. System Architecture for Decentralized Goal Selection

Designing a decentralized crowdsourcing protocol that accommodates self-selected goals demands a layered architecture in which goal specification, commitment, verification, and reward linkage are transparently recorded and enforced. At the base layer, a distributed ledger provides an immutable event log that captures each worker's goal declaration, subsequent task contributions, and any quality assessments performed by requesters or automated evaluators. Smart contracts implement the mechanism logic, taking as input the vector of declared goals, the actual task outputs, and composite reputation scores, and producing reward allocations and reputation updates as outputs. Because on-chain computation is expensive and latency-sensitive, the architecture must carefully partition responsibilities: lightweight goal commitments and reward settlement occur on-chain, while heavy computation such as machine learning-based quality inference or peer review aggregation may be executed off-chain by a committee of verifiers whose attestations are submitted via oracle contracts.

A critical architectural decision concerns the degree of goal verifiability. In domains where task outcomes can be objectively validated—such as image classification with ground truth or data entry with known answers—the protocol can directly compare a worker's self-set accuracy target against actual performance and adjust rewards algorithmically. In more subjective or creative tasks, verification must rely on peer consensus or statistical sampling, introducing noise that attenuates the link between goal and payout. The system must therefore provide workers with credible feedback about the precision of verification so that they can calibrate their goal choices rationally. This can be achieved by maintaining a public history of verification outcomes, aggregated at the level of task categories, such that new entrants can form realistic expectations about the mapping from self-set quality goals to eventual performance scores.

Another design dimension is the temporal granularity of goal selection. Workers could set goals for each individual task, for a batch of tasks, or for a longer epoch such as a week. Shorter horizons provide finer alignment with immediate motivation but increase transaction volume and on-chain footprint. Longer horizons allow workers to smooth effort across variable task availability but introduce commitment problems if early underperformance cannot be compensated later. The protocol might support multiple tiers of goal granularity, allowing workers to choose an overall earnings target for the epoch while also specifying sub-goals for particular task types, with smart contracts that reconcile these nested declarations.

Scalability considerations are paramount. A naive implementation that stores each goal declaration and its associated verification data entirely on-chain would quickly become prohibitive as the workforce grows. Layer-two scaling solutions, such as state channels or rollups, permit workers and requesters to exchange task data and attestations off-chain while posting only aggregate commitments and proofs to the main chain. In such an arrangement, the mechanism's integrity hinges on the secure transition between off-chain interactions and on-chain settlement, including challenge periods during which fraudulent goal reporting or attestation can be disputed. Designing these challenge games to be robust against collusion between workers and verifiers, while maintaining accessibility for participants with limited technical sophistication, is a central engineering challenge.

4. Governance and Incentive Compatibility

The introduction of self-selected goals transforms the incentive landscape of a decentralized crowdsourcing system because workers now have two kinds of strategic actions: the effort they exert and the goal they declare. A worker might be tempted to set an easily attainable goal to collect baseline rewards while limiting exposure to downside risk, or conversely, to set an ambitiously high goal knowing that the verification process is noisy and that punishment for underperformance is mild. Mechanism designers must therefore construct a reward function that makes truthful, appropriately ambitious goal declaration a dominant or at least Bayesian Nash equilibrium strategy under reasonable assumptions about peer behavior and verification error.

One natural approach is to link rewards not only to the absolute level of performance but to the accuracy of the worker's self-prediction. If the reward for a given task output increases in performance but decreases in the squared deviation between the declared goal and the realized outcome, workers have an incentive to report their true expected performance conditional on their planned effort. This principle, reminiscent of proper scoring rules in forecasting, can be adapted to crowdsourcing settings with careful handling of the cost of effort and risk attitudes. In a decentralized protocol, such a scoring function can be encoded in a smart contract that calculates payments deterministically from on-chain commitments, obviating the need for a central authority to adjudicate disputes about goal accuracy.

However, incentive compatibility must be considered within the broader governance structure of the decentralized platform. Unlike a centralized firm that can unilaterally change reward parameters in response to emergent behaviors, a decentralized protocol typically evolves through community governance mechanisms such as token-weighted voting or quadratic voting among stakeholders. If the parameters of the goal-scoring function are subject to modification by governance proposals, workers and requesters will form expectations about future rule changes and may strategically influence governance processes to capture rents. This creates a "rules about rules" problem: the meta-mechanism that determines how the mechanism parameters are updated must itself be incentive-compatible and resistant to coalitional manipulation. Formal analysis and simulation studies of decentralized autonomous organizations suggest that on-chain governance, while transparent, is vulnerable to plutocratic tendencies and low voter participation, which could allow a small group of large token holders to adjust goal thresholds in ways that disadvantage smaller workers. Mitigations such as conviction voting, time-locked parameter changes, and constitutional constraints encoded at the protocol's genesis help preserve the stability of the goal mechanism over time.

Collusion between workers and requesters poses an additional threat. A requester might compensate a worker outside the protocol to declare an inflated goal, thereby boosting the worker's reputation score and influencing task allocation algorithms. Because collusive side payments are invisible on-chain, the protocol must rely on statistical anomaly detection and community monitoring to flag suspicious patterns, such as clusters of workers with improbably high goal accuracy that do not correspond to independent quality improvements. The design of such social monitoring systems intersects with the literature on decentralized reputation and peer prediction, where truthful reporting of observations is incentivized through mutual evaluation games.

5. Robustness, Fairness, and Quality Assurance

A decentralized mechanism that relies on self-selected goals must be robust not only to strategic manipulation but also to the heterogeneity of worker populations, the volatility of task demand, and the evolution of skill distributions over time. Robustness here refers to the property that the overall quality of task completion and the fairness of reward distribution do not degrade dramatically when the system is subjected to unmodeled behavioral variation or adversarial perturbations. In the context of self-selected goals, a particularly salient concern is that workers from different socioeconomic backgrounds, with varying levels of digital literacy or risk tolerance, will react differently to the goal-setting interface, potentially leading to systemic inequities.

For instance, workers who are less confident or who face liquidity constraints may systematically set lower goals, which could in turn reduce their access to high-paying, reputation-gated tasks if the allocation algorithm treats ambitious goal-setting as a positive signal of reliability. The protocol could inadvertently create a self-reinforcing cycle where disadvantaged workers remain trapped in low-goal, low-reward microtasks while confident, well-resourced workers escalate into premium task tiers. Fairness-aware design thus requires that goal declarations be interpreted contextually, perhaps by normalizing them against each worker's historical performance trajectory or by using demographic-agnostic calibration techniques borrowed from fair machine learning. Decentralization offers a unique opportunity to audit these fairness properties transparently: because all goal declarations and associated outcomes reside on a public ledger, third-party researchers and civil society organizations can continuously evaluate the system's equity without needing access to proprietary platform data. Such algorithmic accountability, however, must be balanced against privacy protections, and techniques such as zero-knowledge proofs can enable audits of aggregated fairness metrics without revealing individual worker identities.

Quality assurance presents another deep challenge. When goals are self-selected, the platform cannot directly enforce a uniform quality floor through top-down thresholds. Instead, quality must emerge from the interplay of reputation incentives, selective task allocation, and the economic consequences of failing to meet one's declared goal. If workers consistently set low accuracy goals and the verification process does not penalize them sufficiently, the overall pool of task outputs may degrade, causing requesters to exit the platform. Conversely, if penalties for missing goals are too harsh, risk-averse workers may either avoid the platform or set goals so conservative that the mechanism fails to differentiate high performers. Calibrating these trade-offs requires ongoing experimentation supported by simulation environments that model worker entry, learning, and exit under various parameter regimes.

The decentralized nature of the protocol also affects how quality assurance mechanisms respond to shifts in task demand. In a centralized platform, managers can manually intervene during demand surges to relax quality standards or to offer bonuses. In a decentralized system, such adjustments must be anticipated by algorithmic rules that adjust goal-scoring functions based on aggregate capacity utilization metrics. For example, a smart contract could automatically widen the tolerance band around goal deviations when the number of outstanding tasks exceeds a threshold, thereby incentivizing more workers to participate without permanently diluting quality standards. Designing these adaptive mechanisms in a transparent and predictable manner is essential to maintaining worker trust.

6. Infrastructure, Deployment, and Scalability

Moving from conceptual design to real-world deployment of a decentralized crowdsourcing protocol with self-selected goals necessitates confronting a series of infrastructure challenges that span computation, networking, and user experience. The current generation of public blockchains, even with optimizations such as proof-of-stake consensus and sharding, imposes latency constraints in the order of seconds to minutes for finality, and transaction fees that can fluctuate wildly with network congestion. These constraints are incompatible with microtask workflows where workers expect near-instantaneous feedback after submitting a result. Hybrid architectures that combine a high-throughput off-chain coordination layer with periodic on-chain checkpointing offer a pragmatic path forward. Under such a design, workers interact with a peer-to-peer task distribution network that maintains a cryptographically verifiable log of goal commitments, submissions, and preliminary evaluations; only aggregate state updates and dispute resolutions are committed to the main chain.

The user interface and experience layer must democratize access to the complex cryptographic underpinnings. Workers should not be required to manage private keys, gas fees, or blockchain confirmations directly. Meta-transaction relays, account abstraction, and custodial wallets with social recovery mechanisms can lower the participation barrier, though they reintroduce points of centralization that must be carefully audited. The goal-selection interface itself requires thoughtful behavioral design: presenting workers with probabilistic projections of their expected earnings conditional on different goal levels, visualizations of peer goal distributions, and gentle nudges informed by the experimental evidence on goal setting [5] can help workers form more accurate self-assessments without coercive manipulation. However, these design choices carry ethical weight, as the boundary between informative feedback and exploitative gamification is often ambiguous.

Scalability also intersects with governance. As the protocol attracts a global, multilingual workforce, the governance process must accommodate diverse cultural norms regarding goal orientation, risk, and collective responsibility. On-chain voting mechanisms that rely on token holdings may systematically underrepresent workers from regions with lower capital endowments, who are precisely the population most likely to benefit from self-selected goal mechanisms that enhance autonomy. Alternative governance models, such as liquid democracy with delegation or bicameral bodies that balance capital-based and labor-based representation, could be explored to ensure that parameter updates to the goal mechanism reflect the interests of the broader participant base. Institutional experimentation in this domain remains nascent, and the long-term viability of decentralized labor protocols will depend heavily on their ability to foster legitimacy among globally dispersed stakeholders.

7. Policy, Ethics, and Sustainability

The introduction of decentralized goal mechanisms into crowdsourcing raises regulatory and ethical questions that transcend technical design. The classification of workers as independent contractors or employees has been a flashpoint in platform governance, and decentralized protocols that allow workers to set their own goals and work schedules might strengthen the argument that they operate as autonomous micro-entrepreneurs. Yet the reality is more nuanced: if the protocol's smart contracts effectively penalize workers who set conservative goals by starving them of task allocations, the de facto economic pressure could be just as coercive as centralized algorithmic management, albeit enacted through transparent code rather than opaque corporate policy. Policymakers may therefore scrutinize whether decentralized goal mechanisms constitute a form of algorithmically mediated control that triggers employment obligations, regardless of the absence of a traditional employer.

Data sovereignty and privacy are additional policy dimensions. A permissionless ledger that stores every goal declaration and verification outcome creates a permanent, publicly accessible record of individual performance. While pseudonymity can obscure real-world identities, the accumulation of rich longitudinal data enables a variety of inference attacks that could de-anonymize workers and expose sensitive patterns such as health-related fluctuations in productivity or caregiving responsibilities. Regulatory frameworks such as the European Union's General Data Protection Regulation establish rights to rectification and erasure that conflict with the immutability guarantees of blockchains. Designing goal mechanisms that are compatible with these rights—for example, by storing personal data off-chain with cryptographic proofs of compliance—is an urgent research and engineering priority.

Sustainability of the protocol as an economic institution hinges on its ability to attract a balanced ecosystem of workers and requesters over time while avoiding the extractive dynamics that have marred centralized platforms. If the goal mechanism is tuned to strongly incentivize ambition, it may exacerbate burnout and churn among workers, undermining the long-term human capital base of the system. Conversely, if the mechanism is too lenient, requesters will seek alternative platforms with higher quality guarantees. Striking a dynamic equilibrium requires feedback loops that continuously monitor worker welfare metrics—such as retention, self-reported satisfaction, and physiological stress indicators where ethically collected—and adjust protocol parameters through transparent governance. Embedding such welfare-oriented feedback into a decentralized mechanism represents a novel extension of the "platform cooperativism" ethos into the realm of algorithmic design, challenging the traditional separation between market efficiency and worker protection.

8. Conclusion

This paper has articulated a vision for decentralized crowdsourcing platforms in which workers are not passive recipients of externally imposed targets but active participants in defining their own performance goals within a transparent and collectively governed protocol. By integrating recent empirical insights on goal setting in gig work [5] with advances in decentralized mechanism design and blockchain-based infrastructure, we have outlined a layered architecture that balances individual autonomy with system-level quality assurance. We examined the intricate incentive compatibilities that arise when goal declarations become strategic variables, identified robustness and fairness challenges rooted in worker heterogeneity, and discussed the infrastructural and policy complexities of scaling such a system to a global workforce. The analysis reveals that while decentralization can reduce certain inequities and information asymmetries inherent in centralized platforms, it introduces new governance dilemmas—particularly around parameter evolution, collusion, and the tension between on-chain immutability and data protection rights. The pathway forward requires interdisciplinary collaboration spanning distributed systems, behavioral economics, law, and human-computer interaction. Future research should develop formal equilibrium models of self-selected goal mechanisms under realistic verification noise, conduct field deployments that test alternative interface and incentive designs, and engage with regulators to co-design compliance frameworks that preserve the empowering potential of decentralized protocols while safeguarding fundamental labor rights. In an era where algorithmic intermediation of work is accelerating, reclaiming worker agency through participatory mechanism design is not merely a technical optimization but a normative commitment to a more just and resilient digital economy.

References

1. Kittur, A., Nickerson, J. V., Bernstein, M., Gerber, E., Shaw, A., Zimmerman, J., ... & Horton, J. (2013). The future of crowd work. In Proceedings of the 2013 conference on Computer supported cooperative work (CSCW '13) (pp. 1301-1318). ACM. https://doi.org/10.1145/2441776.2441923

2. Horton, J. J., & Chilton, L. B. (2010). The labor economics of paid crowdsourcing. In Proceedings of the 11th ACM conference on Electronic commerce (EC '10) (pp. 209-218). ACM. https://doi.org/10.1145/1807342.1807376

3. Cavallo, R., & Jain, S. (2012). Efficient crowdsourcing contests. In Proceedings of the 11th International Conference on Autonomous Agents and Multiagent Systems (AAMAS '12) (pp. 677-684). International Foundation for Autonomous Agents and Multiagent Systems.

4. Lu, Y., Tang, Q., & Wang, G. (2018). ZebraLancer: Private and anonymous crowdsourcing system atop open blockchain. In 2018 IEEE 38th International Conference on Distributed Computing Systems (ICDCS) (pp. 853-865). IEEE. https://doi.org/10.1109/ICDCS.2018.00088

5. Min, X., Chi, W., Hu, X., & Ye, Q. (2024). Set a goal for yourself? A model and field experiment with gig workers. Production and Operations Management, 33(1), 205-224.

6. Chen, M. K., Chevalier, J. A., Rossi, P. E., & Oehlsen, E. (2019). The value of flexible work: Evidence from Uber drivers. Journal of Political Economy, 127(6), 2735-2794. https://doi.org/10.1086/702171

7. Rosenblat, A., & Stark, L. (2016). Algorithmic labor and information asymmetries: A case study of Uber’s drivers. International Journal of Communication, 10, 3758-3784.

8. Gaikwad, S. N. S., Whiting, M. E., Gamage, D., Zigmond, D., Gilbee, A., Salekin, S., ... & Dow, S. P. (2016). Boomerang: Rebounding the consequences of reputation feedback on crowdsourcing platforms. In Proceedings of the 29th Annual Symposium on User

Interface Software and Technology (UIST '16) (pp. 625-637). ACM. https://doi.org/10.1145/2984511.2984542

9. Huang, N., Burtch, G., Hong, Y., & Pavlou, P. A. (2020). Unemployment and worker participation in the gig economy: Evidence from an online labor market. Information Systems Research, 31(2), 431-448. https://doi.org/10.1287/isre.2019.0896

10. Bergemann, D., & Morris, S. (2005). Robust mechanism design. Econometrica, 73(6), 1771-1813. https://doi.org/10.1111/j.1468-0262.2005.00638.x

11. De Filippi, P., & Wright, A. (2018). Blockchain and the law: The rule of code. Harvard University Press.

12. Wright, A., & De Filippi, P. (2015). Decentralized blockchain technology and the rise of lex cryptographia. Available at SSRN 2580664.

13. Resnick, P., Zeckhauser, R., Friedman, E., & Kuwabara, K. (2000). Reputation systems. Communications of the ACM, 43(12), 45-48. https://doi.org/10.1145/355112.355122

14. ILO (2021). World Employment and Social Outlook 2021: The role of digital labour platforms in transforming the world of work. International Labour Organization.

15. Diakopoulos, N. (2016). Accountability in algorithmic decision making. Communications of the ACM, 59(2), 56-62. https://doi.org/10.1145/2844110

16. Kittur, A., Smus, B., Khamkar, S., & Kraut, R. E. (2011). CrowdForge: Crowdsourcing complex work. In Proceedings of the 24th annual ACM symposium on User interface software and technology (UIST '11) (pp. 43-52). ACM. https://doi.org/10.1145/2047196.2047202

17. Easley, D., & Kleinberg, J. (2010). Networks, crowds, and markets: Reasoning about a highly connected world. Cambridge University Press.

18. Koutsoupias, E., & Papadimitriou, C. (1999). Worst-case equilibria. In STACS 99 (pp. 404-413). Springer. https://doi.org/10.1007/3-540-49116-3_38

19. Luu, L., Teutsch, J., Kulkarni, R., & Saxena, P. (2015). Demystifying incentives in the consensus computer. In Proceedings of the 22nd ACM SIGSAC Conference on Computer and Communications Security (CCS '15) (pp. 706-719). ACM. https://doi.org/10.1145/2810103.2813659

20. Corbett-Davies, S., & Goel, S. (2018). The measure and mismeasure of fairness: A critical review of fair machine learning. arXiv preprint arXiv:1808.00023.