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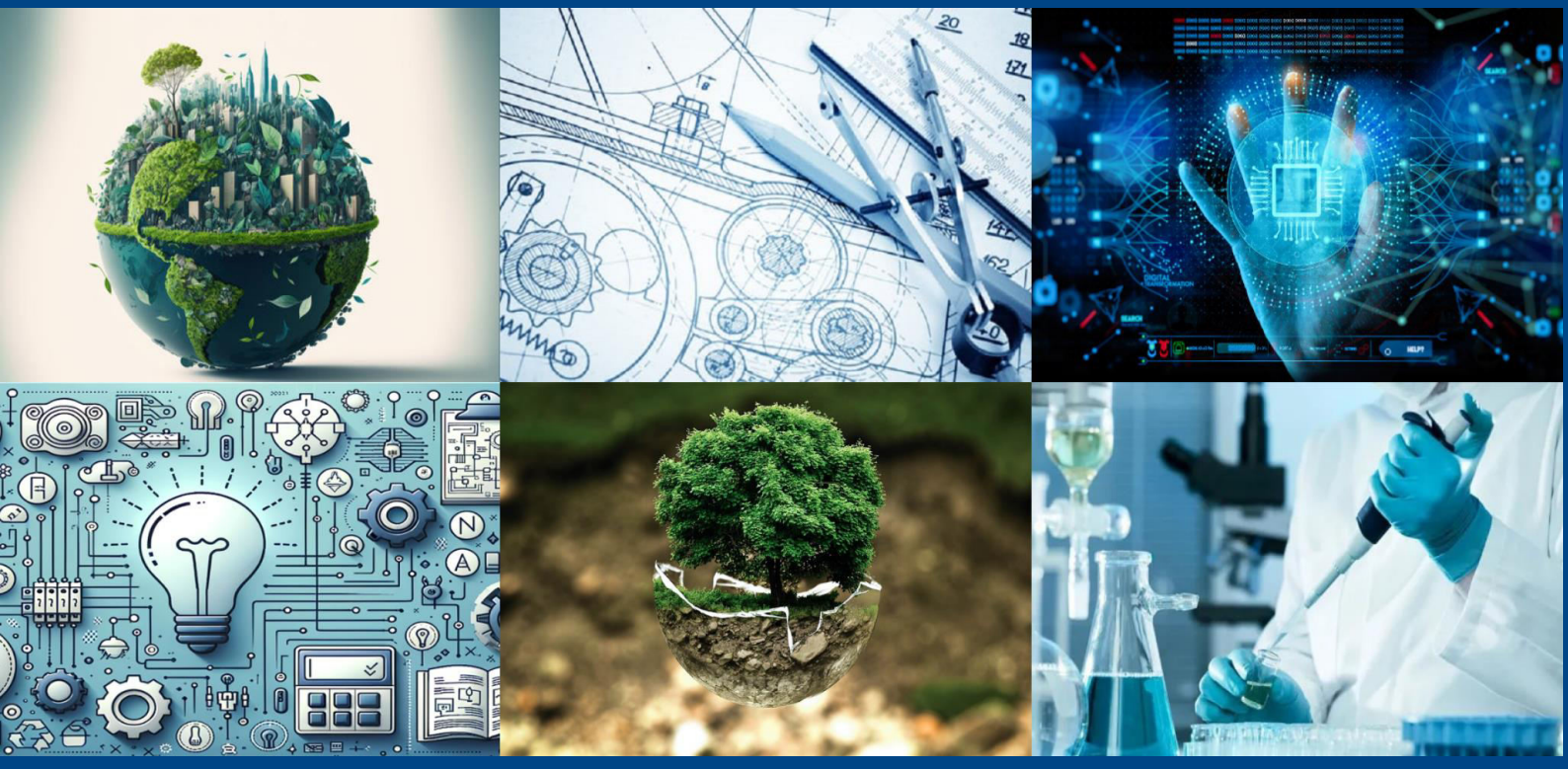

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ABILISTO: A Digital Platform Connecting Skilled Workers and Clients Through Verified Job Matching and On-Demand Assistance

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ABSTRACT: The localized service economy of the CarCanMadCarLan municipalities in Surigao del Sur, Philippines, is hampered by information asymmetry, trust deficits, and dependence on informal referral networks. This study developed Abilisto, a web-based digital labor marketplace anchored on the ADDIE framework, featuring a Dual-Path Verification System and a Weighted Multi-Criteria Decision-Making (MCDM) Quick Match algorithm. Evaluated through User Acceptance Testing with 115 pilot participants (54 skilled workers, 61 clients) using ISO/IEC 25010 quality dimensions, the platform yielded grand weighted means of 4.43 (workers) and 4.45 (clients), demonstrating that community-grounded digital architectures can reduce information asymmetry and advance rural digital inclusion.

KEYWORDS: Digital labor marketplace, skilled worker matching, dual-path verification, MCDM algorithm, rural digital inclusion

I. INTRODUCTION

The local service economy in the CarCanMadCarLan (Carrascal, Cantilan, Madrid, Carmen, and Lanuza) municipalities of Surigao del Sur, Philippines, is characterized by persistent information asymmetry and limited trust between households and skilled workers. Residents struggle to find reliable electricians, plumbers, and carpenters, particularly in urgent situations, while skilled workers endure inconsistent income and lack structured channels to market their capabilities.

The Innovative Startup Act (RA 11337) creates a legal pathway for technology to bridge social and economic gaps. Despite this support, global platforms like Fiverr fail local informal workers by presupposing urban digital literacy and bureaucratic credential systems absent in rural Philippine settings (Wood et al., 2019). Research demonstrates that hybrid verification combining formal credential checks with community-based social vouching outperforms either mechanism alone (Roy & Saha, 2021), and that multi-criteria matching systems incorporating proximity, availability, and reputation produce significantly higher match acceptance rates (Horton, 2017; Agrawal et al., 2020). This study addresses that gap by developing Abilisto, a localized digital labor marketplace supporting UN SDGs 8 and 9 through improved access to decent work and digital infrastructure.

II. LITERATURE SURVEY

The gig economy's global expansion has been extensively documented. Manyika et al. (2016) identified digital platforms as transformative intermediaries enabling flexible employment, while Kässi and Lehdonvirta (2018) demonstrated their rapid adoption in high-unemployment regions. Wood et al. (2019) examined gig platforms across multiple countries and highlighted the dual challenge of creating income opportunities while managing platform governance and worker protections.

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Trust is the foundational element of successful digital service platforms. Smith and Johnson (2021) confirmed that trust influences user adoption universally, while Ali et al. (2025) provided empirical evidence that transparency and ethical practices directly produce deeper consumer trust. Roy and Saha (2021) established that verification systems significantly strengthen platform credibility, with users willing to pay premium fees for platforms with stronger verification protocols.

Algorithmic matching efficiency directly impacts platform success. Agrawal, Singh, and Mehta (2020) demonstrated that multi-criteria algorithms reduced search costs and improved transaction completion rates by approximately 35%. Horton (2017) found that effective matching mechanisms reduce information asymmetry and improve market efficiency by approximately 40%.

In the Philippine context, Santos (2023) documented significant adoption of digital platforms for service acquisition, while Cruz (2021) identified trust deficits and verification gaps as critical barriers. Dagdag et al. (2020) confirmed that skilled workers in the informal sector face irregular income and limited market exposure. TESDA (2020) data reveals that certified workers' qualifications remain invisible to local consumers due to absent digital matching channels. No existing system integrates formal TESDA credential verification with community-based social vouching within a single weighted matching algorithm tailored to rural Mindanao communities, which is the gap this study fills.

III. METHODOLOGY / APPROACH

A. Theoretical Framework

The study is grounded in two theoretical frameworks. The Technology Acceptance Model (TAM) informed the platform's interface design—Perceived Ease of Use drove the adoption of a "Smart Assisted Interface" with visual badges and one-tap booking flows to minimize cognitive load for users with varying digital literacy. Signaling Theory (Spence, 1973) justified the Dual-Path Verification model: a TESDA National Certificate badge functions as a hard signal of formal skill, while a Community-Verified badge functions as a soft signal of social endorsement. The study adopted an Input-Process-Output (IPO) conceptual model (Figure 1).

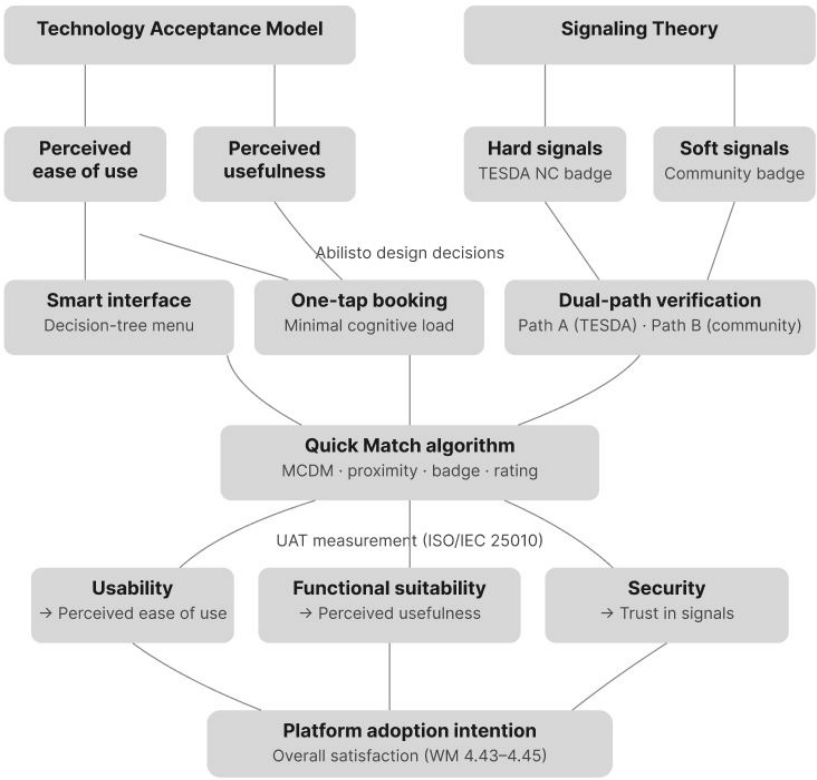

Figure 1: Theoretical Background

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B. Research Design and SDLC

Abilisto was developed as a responsive, web-based platform following the ADDIE (Analysis, Design, Development, Implementation, Evaluation) systems development model (Figure 2). The platform implements PHP, HTML5, Tailwind CSS, and Vanilla JavaScript for the frontend; MySQL via XAMPP for the backend; Socket.io for real-time bidirectional communication; Leaflet.js for geospatial mapping; and VAPID-based push notifications for instant booking alerts.

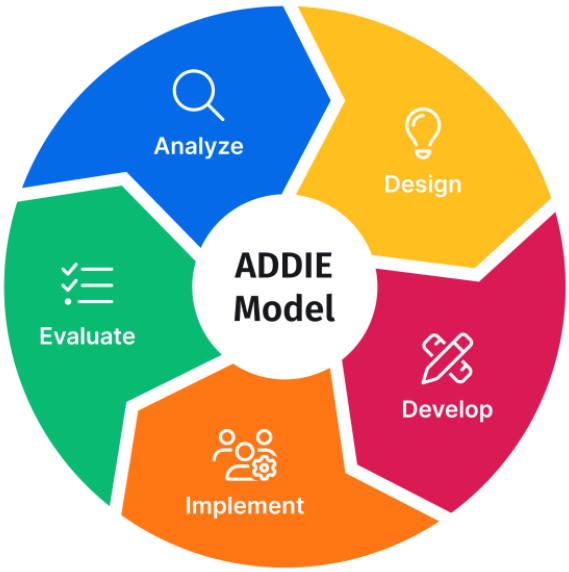

Figure 2: ADDIE System Development Life Cycle

C. Dual-Path Verification Architecture

To address the trust deficit, Abilisto implements a Dual-Path Verification model. Path A (Digital Verification) applies to TESDA-certified workers who upload government-issued IDs and National Certificates for administrator review, resulting in a Verified Badge. Path B (Community Verification) applies to non-certified workers who submit barangay clearances and work portfolios, resulting in a Community-Verified Badge. Both paths are factored into the Quick Match MCDM scoring function as discrete weighted criteria.

D. Quick Match Algorithm

The Quick Match algorithm operates in three sequential stages: (1) Filtering — a structured SQL query narrows the worker pool by skill category match, active status, and valid GPS coordinates; (2) Geographic Distance Calculation — the Haversine formula computes the great-circle distance between the client and each worker, excluding workers beyond 10 km; and (3) MCDM Scoring — each eligible worker receives a composite score based on weighted criteria (Table 1). Workers are ranked highest-to-lowest, with available workers prioritized, and the Top 5 are presented to the client. A dynamic price estimate is also generated: Total Price = 15 (Base Fee) + (⌈Distance⌉ × 5) + Urgency Surcharge.

Table 1: Quick Match MCDM Scoring Criteria

Criterion	Points	Condition
Availability	+50	Worker status is “Available”
Gold Badge	+30	Highest trust tier badge
Silver Badge	+20	Mid-tier badge
Bronze Badge	+15	Entry-level badge
Community Badge	+10	Community-vouched worker
Verified Status	+10	skill_verified = true

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Rating Score	Rating × 4	Max: 20 pts at 5-star rating
Proximity (0–2 km)	+20	Closest tier
Proximity (2–5 km)	+14	Second tier
Proximity (5–7 km)	+8	Third tier
Proximity (7–10 km)	+3	Furthest eligible tier
Emergency Bonus	+10	Emergency + worker within 3 km

Figure 3: Quick Match Process Flowchart

E. User Acceptance Testing

A total of 115 participants were recruited via purposive sampling: 54 skilled workers (28 NC Holders, 26 non-certified) and 61 clients. The UAT followed three stages: orientation, guided platform interaction, and formal evaluation using an ISO/IEC 25010-aligned Likert-scale instrument measuring Functional Suitability, Usability, Reliability, Performance Efficiency, Security, and Overall Satisfaction. Statistical treatment included weighted means, standard deviations, Cronbach's Alpha, and System Usability Scale (SUS) scoring.

IV. RESULTS AND DISCUSSION

A. Client and Worker Challenge Analysis

Community consultations revealed five recurring client-side barriers: over-reliance on informal word-of-mouth referrals (72% frequent), inability to verify worker credentials (67%), difficulty locating available workers (62%), inconsistent

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service pricing (57%), and absence of a structured booking channel (61%). On the worker side, five challenges were identified: irregular job opportunities (80%), limited market visibility (74%), no formal skill showcase channel (70%), difficulty establishing credibility without documents (65%), and inconsistent pay (67%). These findings are consistent with Cruz (2021) and Dagdag et al. (2020), and directly informed each Abilisto feature through a documented Problem-to-Feature Derivation process.

B. ISO/IEC 25010 Evaluation Results

Table 2 presents the summary of UAT results across all quality dimensions for both user groups. Security emerged as the highest-rated dimension for clients (WM = 4.49), with 55% of clients strongly agreeing that the Dual-Path Verification System substantially enhanced trust. Workers rated Security highest among all dimensions (WM = 4.47), with the verification system's impact on credibility receiving a Strongly Agree rating (WM = 4.50). Performance Efficiency received the lowest ratings for both groups (Workers: 4.37; Clients: 4.41), reflecting the hardware constraints of the pilot deployment context, though scores remained within the Agree range. Near-parity between worker and client scores across all dimensions indicates that the single-codebase responsive design served both demographically distinct user groups equally well.

Table 2: Summary of UAT Evaluation Results

Quality Characteristic	Workers WM	Clients WM	Interpretation
A. Functional Suitability	4.45	4.47	Agree
B. Usability	4.43	4.44	Agree
C. Reliability	4.40	4.42	Agree
D. Performance Efficiency	4.37	4.41	Agree
E. Security	4.47	4.49	Agree
F. Overall Satisfaction	4.48	4.49	Agree
Grand Mean	**4.43**	**4.45**	**Agree**

Cronbach's Alpha values for all six dimensions exceeded 0.98 for both user groups (Grand Mean α: Workers = 0.993; Clients = 0.991), confirming excellent instrument internal consistency. SUS scores validated cross-cohort accessibility independent of baseline digital literacy variations. The functional features were well-received, with clients rating Quick Match recommendation accuracy at WM = 4.48, reflecting the MCDM algorithm's perceived effectiveness in reducing search friction. These pilot-phase findings should be interpreted as perception-based under guided demonstration conditions and not as confirmed longitudinal behavioral outcomes.

V. CONCLUSION

This study successfully designed, developed, and evaluated Abilisto, a localized web-based digital labor marketplace for the CarCanMadCarLan municipalities of Surigao del Sur, Philippines. Grounded in the ADDIE framework and guided by TAM and Signaling Theory, the platform produced grand weighted means of 4.43 (skilled workers) and 4.45 (clients) across all ISO/IEC 25010 quality dimensions, confirming that ABILISTO achieved its primary objective of delivering a functional, verified, and user-accepted digital platform at the proof-of-concept level. The Dual-Path Verification System effectively addressed the trust deficit on both sides of the marketplace, and the MCDM-powered Quick Match algorithm was perceived as substantially reducing search friction while expanding market visibility for skilled workers.

Future work should include: API integration with TESDA's National Registry for real-time credential validation; formal MCDM weight validation using the Analytic Hierarchy Process (AHP); development of a native Android/iOS application; longitudinal impact assessment with behavioral metrics (match acceptance rates, income stability, worker retention); and dedicated evaluation of the Report and Penalty System's fairness and deterrent effectiveness. Policymakers are encouraged to develop worker protection frameworks aligned with DOLE guidelines to ensure platforms like Abilisto serve genuine worker empowerment rather than reproducing digital informality.

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