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AI-Based Pricing under Extreme Customisation: Restructuring Pricing Practices in a Commercial Printing Case

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ABSTRACT

Pricing remains one of the least digitised and most opaque operational functions in the commercial printing industry due to extreme product variation and continued reliance on manual, experience-based pricing practices. This study examines how an AI-enabled Smart Pricing System (AISPS) was integrated into the pricing practice in a commercial printing firm in Johor Bahru, Malaysia, with cross-border operations linked to Singapore and Malaysia. Using a qualitative single-case design based on semi-structured interviews with three internal participants, supported by field observations and organisational artefacts, the study analyses how the system was used in practice. Interview evidence indicates that AISPS combined rule-based pricing logic for product configuration and quotation with data-driven analytical functions used to interpret user behaviour and support subsequent decisions. The findings show that the system reduced the complexity of online product listing, improved the usability of wholesaler pricing data, and supported the shift from manual quotation to digitally mediated pricing workflows. Rather than claiming broad market effects beyond the case, the study shows how an AI-enabled pricing system can reorganise the internal pricing work in a highly customised commercial printing environment. The paper contributes to research on technology adoption and digital transformation by offering a bounded, practice-oriented account of how pricing systems become embedded in everyday organisational routines.

1. INTRODUCTION

Commercial printing is widely characterised by extreme customisation, in which prices are determined by interdependent combinations of substrates, finishing options, quantities, and production constraints. As firms increasingly adopt e-commerce and web-to-print ordering systems, customers can configure products directly, reducing reliance on manual sales interactions while increasing the dimensionality of the pricing task. Prior research suggests that such combinatorial expansion places considerable strain on traditional, experience-based quoting practices, which are difficult to scale under conditions of high product variety

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and time pressure (Duan et al., 2015; Lunardi et al., 2021). In this environment, pricing extends beyond a purely market-facing function and operates as a coordination mechanism that links production feasibility, cost structures, and delivery commitments. When firms are unable to manage this complexity effectively, pricing itself becomes a critical operational bottleneck, with implications for efficiency and responsiveness within digitally mediated commercial printing environments (Duan et al., 2015).

At the same time, the diffusion of digital printing and web-to-print platforms has shifted commercial printing toward service-oriented delivery, where speed, configuration, and responsiveness matter alongside print quality (Bates et al., 2022). E-commerce adoption has altered how printing services are marketed, configured, and ordered, pushing firms toward web-based self-configuration and real-time pricing requirements (Thomas & Douglas, 2021). While wider market access and easier customisation increase competitive pressure, they also intensify pricing demands, as firms must translate highly variable customer specifications into accurate and timely prices at scale. This shift requires internal processes that were historically built around manual quoting and interpersonal coordination to be revised for digitally mediated workflows. Although smaller firms may adapt more quickly due to fewer legacy routines, larger firms often face coordination challenges across systems and departments when integrating digital ordering with pricing activities (Abebe, 2014; Kluczek et al., 2023). These pressures have been compounded by broader contextual factors, including volatile demand, rapid technology cycles, and disruptions to input costs, which further complicate price setting under already complex configurations (Amri et al., 2022; Masod & Zakaria, 2023). In response, firms have expanded digital channels and adopted web-to-print and cloud-based workflows to stabilise operations and maintain responsiveness (Safonov et al., 2023; Trakadas *et al.*, 2020).

Against this backdrop, this paper examines how an AI-based Smart Pricing System (AISPS) reshapes pricing practice in a setting characterised by extreme customisation. Using a qualitative case study of a commercial printing firm, the analysis examines how AISPS (i) reduces configuration and listing complexity, (ii) changes access to competitive pricing information, and (iii) supports a shift from manual quoting to digitally mediated pricing. In the present case, AISPS is understood as a hybrid pricing system that combines codified pricing formulas for configuration and quotation with data-driven analytical functions used to interpret user behaviour and support subsequent pricing-related decisions. Rather than treating artificial intelligence as a simple adoption outcome, the study approaches AISPS as a mechanism that reorganises pricing work within the firm. Findings bounded to the conditions of the case examined, while offering transferable explanations relevant to other high-variation operations facing similar pricing coordination challenges.

2. LITERATURE REVIEW

2.1 Technology Adoption and AI Integration in Traditional Industries

Research on technology adoption in organisations has long emphasised that uptake is shaped by more than technical capability alone. Early work on diffusion highlights how firms differ in their willingness to experiment with innovation, particularly in traditional industries where routines, risk perceptions, and established practices influence adoption behaviour (Rogers, 1995). In sectors such as commercial printing, where production processes and pricing practices have historically relied on experiential judgment, new digital technologies are often approached cautiously and adopted unevenly. To move beyond adopter typologies, the Technology–Organization–Environment (TOE) framework provides a structured lens for examining how technological characteristics, organisational conditions, and external pressures jointly shape adoption decisions (Tornatzky & Fleischer, 1990). The framework is particularly suitable for analysing digital technologies in traditional industries, where the value of innovation depends on its alignment with existing workflows and market conditions rather than on technical sophistication alone. Prior research extends this view by emphasising the importance of alignment between digital technologies and business models. Technologies that are poorly integrated into operational routines often fail to generate sustained value, even when they offer analytical or automation advantages (Zhu et al., 2006). In highly customised production environments, misalignment between digital interfaces and internal pricing or production systems can increase coordination costs rather than reduce them. Recent studies on artificial

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intelligence adoption refine these insights by identifying factors that are especially salient for AI-enabled systems. These include perceived compatibility with existing practices, relative advantage, system complexity, managerial support, and the availability of technical resources (Horani et al., 2023). For AI applications embedded in pricing activities, compatibility and complexity are particularly consequential. Pricing systems must interface with cost data, production constraints, and customer-facing platforms, making adoption less about experimentation and more about reliable integration into everyday decision-making. External conditions further shape adoption dynamics. Competitive pressure, dependence on intermediaries, regulatory expectations, and vendor capabilities influence whether firms view AI technologies as strategic necessities or optional enhancements. In markets characterised by price opacity and intense competition, technologies that promise faster pricing responses and greater consistency may gain traction, provided organisational conditions allow them to be operationalised. Taken together, this literature suggests that AI adoption in traditional industries cannot be understood solely as a technological upgrade. Instead, it involves the reconfiguration of organisational routines and information flows within specific competitive environments. Building on this perspective, the present study uses the TOE framework as an interpretive lens to examine how AI-based pricing software is integrated into pricing practice under conditions of extreme product customisation.

2.2 AI-enabled Pricing and Decision-making Systems

Pricing has traditionally relied on a combination of cost accounting, managerial judgment, and accumulated experience, particularly in service-oriented and customised production settings. In such environments, prices are often negotiated or calculated manually, based on heuristics developed through repeated transactions rather than formalised models. While this approach allows flexibility, it becomes increasingly difficult to sustain as product variety expands and transactions move to digital channels. AI-enabled pricing systems have emerged as a response to these limitations. Prior research describes AI applications as tools capable of processing large volumes of data, identifying patterns, and supporting operational decisions that would be difficult to manage manually (Haenlein & Kaplan, 2019). In pricing contexts, these systems are typically used to translate cost structures, demand signals, and competitive information into actionable price recommendations. Unlike static pricing rules, AI-based systems can accommodate frequent updates and multiple constraints, making them particularly relevant in environments with high configuration variability. Despite this potential, empirical research on AI-enabled pricing remains scarce (Chenavaz & Dimitrov, 2025). Much of the existing literature focuses on algorithmic pricing in relatively standardised markets, where products are comparable and pricing inputs are well defined (Assad et al., 2020). Less attention has been given to sectors where prices depend on complex combinations of materials, production processes, and order specifications. In these settings, pricing is not only a computational problem but also an organisational one, involving coordination across sales, production, and procurement functions (Dutta et al., 2003 ; Carr, 2008). Studies that do examine AI in pricing often emphasise performance outcomes, such as revenue improvement or margin optimisation, without detailing how pricing practices themselves change after adoption (Davenport & Ronanki, 2018). As a result, pricing technologies are frequently treated as "black-box" tools whose internal operation and organisational implications remain underexplored. This limits understanding of how AI-based systems are integrated into everyday work and how they interact with existing routines. For traditional industries transitioning to digital ordering platforms, these issues become more pronounced (Lunardi et al., 2021). When customers configure products directly through online interfaces, pricing must be generated quickly, consistently, and transparently. Under such conditions, AI-enabled pricing systems are not merely analytical aids but operational infrastructures that shape how firms present products, manage information, and coordinate internal processes.

This study builds on the emerging literature by examining AI-enabled pricing as an embedded organisational practice rather than as a standalone optimisation tool. By focusing on a commercial printing firm operating under extreme customisation, the analysis seeks to clarify how AI-based pricing systems function in practice and how they reshape pricing activity within the firm.

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2.3 AI-Based Pricing under Extreme Customisation: Unresolved Issues

Although interest in AI-enabled pricing has grown, existing research offers limited insight into how such systems operate in industries characterised by extreme product customisation. Much of the pricing literature focuses on markets where products are standardised, and pricing inputs are stable. In these settings, algorithmic pricing can be examined primarily as a computational or optimisation task. However, this perspective does not readily extend to industries in which prices depend on numerous interacting production choices and operational constraints. In commercial printing, pricing is embedded in everyday organisational activity. Prices must reflect material selection, production feasibility, order quantities, and delivery requirements, often across multiple intermediaries. As a result, pricing systems do more than calculate values; they structure how information flows between sales, production, and external partners. Existing studies rarely examine this organisational dimension of pricing, particularly when AI technologies are involved. Research on AI adoption tends to evaluate implementation success in terms of performance outcomes or adoption determinants, leaving the internal transformation of pricing practices unexplored. When pricing technologies are discussed, they are often treated as "black-box" solutions that improve accuracy or speed, without attention to how they reconfigure routines, responsibilities, or access to pricing information within the firm. This gap is especially pronounced in traditional industries undergoing digital transition, were online ordering and self-configuration place new demands on pricing systems. Under these conditions, AI-based pricing tools may function not only as decision-support technologies but also as mechanisms that reorganise pricing work and market participation. Empirical studies that trace these mechanisms in situ remain scarce.

To address this gap, the present study examines how AI-based Smart Pricing System is integrated into pricing practice within a commercial printing firm operating under conditions of extreme customisation. By focusing on the mechanisms through which pricing activities are reorganised, the study contributes a practice-oriented account of AI-enabled pricing that complements existing research on technology adoption and algorithmic pricing.

3. METHOD

3.1 Research Design and Case Selection

This study adopted a qualitative single-case study design to examine how AISPS was integrated into pricing practice within a highly customised commercial printing environment. A case study approach was appropriate because the research sought to explain how and why pricing practices were reorganised in a real-world setting where the boundaries between technological system, organisational routines, and operating environment were closely intertwined (Yin, 2016). The study was explanatory rather than comparative, focusing on the mechanisms through which AISPS became embedded in everyday pricing activity.

The case was selected through purposeful sampling based on analytical relevance rather than statistical representativeness. The focal firm operated in a commercial printing setting characterised by extreme product variation, digital ordering pressure, dependence on wholesalers, and cross-border market activity. These features made it an information-rich case for examining pricing complexity under conditions where manual quotation and product listing were increasingly difficult to sustain. The aim was not to generalise statistically from one firm to a wider population, but to generate case-based explanations that may be transferable to other high-variation service settings facing similar pricing coordination challenges.

3.2 Data Collection

Data were collected primarily through semi-structured interviews with organisational participants directly involved in the adoption, implementation, and operational use of AISPS. Semi-structured interviewing was chosen because it allowed the researcher to pursue a consistent line of inquiry across participants while retaining flexibility to probe individual experiences, examples, and interpretations in depth (Kvale &

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Brinkmann, 2015). Purposeful sampling was used to identify participants with direct knowledge of pricing practices and system use (Patton, 2002).

The interview set included a managing director, an IT staff member, and a production executive, allowing the study to capture strategic, technical, and operational perspectives on pricing work. One interview with the managing director was conducted across multiple sessions, accounting for its extended total duration. All interviews were audio-recorded with participant consent and transcribed verbatim. In cases where participants moved between Malay and English, segments were checked against the audio recordings during analysis to preserve intended meaning. Table 1 summarises the interviewee profiles and their roles in relation to AISPS.

Table 1. Profile of Interviewees

Respondent	Position	Primary Responsibilities	Role in AISPS	Years of Experience	Interview Duration (min)
A	Managing Director / Business Owner	Strategic planning, operational oversight, financial management, and business growth decisions	Provides strategic direction for AISPS adoption and evaluates its business rationale and industry impact	20	229
B	IT Staff Member	IT infrastructure management, system maintenance, user support, and software integration	Implements AISPS, manages technical configuration, and ensures system reliability and functionality	6	49
C	Production Executive	Supervision of daily production activities, interdepartmental coordination, scheduling, and quality control	Uses AISPS to monitor workflows, improve efficiency, and support timely delivery of printing orders	8	62

3.3 Data Analysis

Interview transcripts were analysed using thematic analysis to identify recurring patterns related to pricing practice, system use, and organisational change. The analysis followed an iterative process informed by Braun & Clarke, (2012), beginning with repeated familiarisation with the transcripts and audio recordings, followed by initial coding, code comparison, category refinement, and theme development. NVivo software was used to support systematic coding, memo writing, and retrieval of data segments.

Initial coding was conducted by the researcher across all interviews, with attention to how participants described pricing work before AISPS, how they explained the system's role in practice, and what changes they associated with its adoption. Codes were then compared across interviews to identify recurring patterns, points of convergence, and areas of tension. Related codes were grouped into broader categories, which were refined through repeated return to the transcripts and through ongoing memo writing. This process allowed early interpretations to be assessed against the full dataset rather than being derived from isolated quotations.

Theme development focused on identifying how pricing activity was reorganised following system adoption. Particular attention was given to contrasts between pre-existing manual practices and digitally mediated workflows, to changes in access to pricing information, and to the operational role of AISPS in managing configuration complexity. The final themes were selected based on their recurrence across the dataset, their explanatory relevance to the research question, and their grounding in participant accounts.

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3.3 Trustworthiness and Ethical Considerations

Several measures were used to strengthen the trustworthiness of the analysis. First, the researcher maintained analytic memos throughout the coding process to document interpretive decisions, emerging patterns, uncertainties, and theme development. Second, preliminary coding structures and developing interpretations were discussed through peer debriefing with academic peers familiar with qualitative inquiry and relevant subject areas, allowing assumptions and category boundaries to be challenged. Third, key excerpts and mechanism-level interpretations were checked with participants during the research process to support credibility.

Trustworthiness was further supported through iterative comparison across interviews, repeated return to transcripts and audio recordings, and the use of supplementary organisational materials to clarify how pricing work and system use were described in practice. Because the Malaysian printing sector is closely networked, participants and firm-level identifiers were anonymised, and references to specific vendors and other potentially identifying details were masked where necessary.

Ethical approval for the study was obtained prior to data collection from the relevant institutional ethics committee under reference REC/02/2026 (ST/MR/32). Informed consent was obtained from participants before interviews were conducted and recorded. The study was designed to protect confidentiality and to report findings at a level that preserved anonymity while retaining analytic value.

4. CASE CONTEXT: FIRM BACKGROUND AND PRICING CHALLENGES

The case firm is a commercial printing provider headquartered in Johor Bahru, Malaysia, with cross-border operations linked to Singapore and Malaysia. It operates primarily as a business-to-business intermediary within regional printing markets, offering customised printing products through digital ordering channels while coordinating production through a network of printing partners and wholesalers. Rather than relying solely on extensive in-house production capacity, the firm manages customer configuration, order processing, and pricing across a wide range of print specifications. This positioning places the firm at the intersection of customer-facing digital platforms and upstream production providers, where pricing accuracy, responsiveness, and coordination are central to daily operations.

The firm operates in an environment characterised by high product variability and pricing complexity. Individual products, such as business cards or marketing materials, can involve numerous combinations of paper type, finishing options, quantity, and turnaround time, making comprehensive online listing and manual pricing difficult to sustain. Pricing practices are further shaped by reliance on wholesalers, whose price lists often contain extensive permutations that are not easily translated into customer-facing formats. As the firm expanded its use of e-commerce channels, the need to generate consistent and timely prices for customer-configured orders became more pronounced. In response to these conditions, the firm introduced an AI-based Smart Pricing System to manage pricing logic and configuration complexity within its digital ordering processes.

4.1 Functional Characterisation of AISPS

Within the case firm, AISPS refers to a proprietary pricing system used to support pricing work under conditions of extreme product variation. Interview evidence indicates that the system performs two related functions. First, it processes complex wholesaler pricing data and product specifications and converts them into a structured pricing format that can be displayed through customer-facing digital ordering channels. In this respect, price generation appears to rely primarily on codified formulas and pricing rules derived from existing pricing knowledge, enabling highly variable print products to be configured and priced without manual calculation for each order.

Second, the system incorporates a data-analytic layer that collects website interaction data and completed-order information to support subsequent business decisions. Participants described this capability as helping the firm interpret user behaviour, anticipate demand patterns, and inform decisions

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about product offering, material planning, and short-term pricing expectations. The system was also described as improving with accumulated data over time, although the present study did not have direct access to the proprietary model architecture, training procedure, or algorithmic specifications underlying that process.

This study treats AISPS as a hybrid pricing system rather than as a purely autonomous pricing engine. Its pricing outputs were described as rule- and formula-based, while its AI-enabled component was associated with data interpretation, prediction, and decision support. Material price updates still required human input, indicating that the system remained partly dependent on managerial and operational intervention. Given the proprietary nature of the system, the present study focuses on participants' descriptions of AISPS and on how the system was integrated into pricing practice within the firm.

5. FINDINGS & DISCUSSION

This section reports the findings of the qualitative analysis addressing the research question of how the adoption of AI-based Smart Pricing System reshaped pricing and operational practices within the case firm. Analysis of the interview data resulted in the identification of three interrelated themes that capture changes in pricing activity following system implementation. These themes relate to (i) a reduction in complexity associated with online product listing, (ii) changes in access to and use of competitive pricing information, and (iii) the transition from traditional, manually mediated pricing processes to digitally mediated workflows. The sections that follow present each theme in turn, drawing on interview evidence to describe how pricing practices were reorganised within the firm. Table 2 presents the link between each theme, its subtheme, an interview excerpt, and its analytical focus.

Table 2. Themes, subthemes, and interview excerpts

Theme	Subtheme	Interview excerpt	Analytical Focus
Reduction in complexity for online product listing	Permutation overload in print configuration System-mediated simplification	*"A simple business card could have 20,000 to 50,000 permutations. How can every printer list all these options online? It's not possible."* *"AISPS comes into this gap. It digests the data into a useful format for the printers' websites."*	Shows pre-AISPS listing difficulty under extreme product variation. Shows how AISPS converted pricing complexity into usable digital listing logic.
Accessibility of competitive pricing information	Dependence on wholesalers Readable pricing access	*"Many printers here don't have their own machines and rely on these wholesalers for their products. The wholesalers provide them with complex pricing data, sometimes with tens of thousands or even millions of permutations."* *"These system [AISPS] uses AI to source out pricing and generate it into a readable format before we upload it to their website."*	Shows pre-AISPS dependence on opaque and difficult-to-use wholesaler pricing data. Shows improved usability of complex pricing information after AISPS.
Transition from traditional to digital platforms	Manual intermediary workflow Instant online quotation	*"Initially, we just take order and pass it to another printer to do the job."* *"By the time you wait too long for the price, the customer is already gone ... we offer live instant price selection."*	Shows manual intermediary workflow before digital pricing integration. Shows the operational need for instant digital quotation in online ordering contexts.

5.1 Reduction in Complexity for Online Product Listing

Analysis of the interview data indicates that pricing-related complexity was most visible in the process of online product listing. Before AISPS was introduced, participants described considerable difficulty in translating highly customised print products into standardised digital formats. This difficulty arose because even relatively simple products involved multiple interdependent pricing variables. As Respondent A explained, *"A simple business card could have 20,000 to 50,000 permutations. How can every printer list all these options online? It's not possible."* In this account, product listing was not a straightforward cataloguing task. It required pricing logic capable of handling large numbers of combinations across paper type, print type, finishing, protection, and quantity.

Under these conditions, online listing depended heavily on simplification, omission, or manual intervention. Rather than presenting the full range of product configurations through digital channels, firms often had to limit what could be listed online or revert to offline quotation for more complex jobs. This suggests that, prior to AISPS, pricing complexity constrained both the scope of online offerings and the ability to provide immediate quotations in customer-facing digital environments.

Participants described a different arrangement after AISPS was implemented. Respondent A stated,

> *"This system [AISPS] comes into this gap. It digests the data into a useful format for the printers' websites."*

This indicates that the system did not remove product complexity itself but reorganised how that complexity was managed. Instead of requiring every pricing permutation to be listed manually, AISPS converted complex pricing structures into a format that could be operationalised within digital ordering interfaces.

These accounts suggest that AISPS reduced listing complexity by shifting pricing work from manual enumeration toward system-mediated configuration. At the technological level, the system embedded pricing logic within the listing process; at the organisational level, this reduced reliance on manual quotation for routine online configurations. In this case, the main change was not the elimination of product variation but the reorganisation of how pricing complexity was processed in digital practice.

5.2 Accessibility of Competitive Pricing Information

The findings indicate that AISPS changed how pricing information was accessed and used within the firm's operating environment. Before system adoption, participants described a market structure in which printers were dependent on wholesalers not only for production, but also for pricing data. This dependence limited their ability to work independently with complex pricing inputs. As Respondent A explained,

> *"Many printers here don't have their own machines and rely on these wholesalers for their products. The wholesalers provide them with complex pricing data, sometimes with tens of thousands or even millions of permutations."*

In this account, the difficulty was not simply obtaining prices but making those prices usable in everyday commercial practice. Under these conditions, wholesaler price lists were difficult to interpret and deploy, especially for smaller firms without the internal capacity to process large numbers of pricing combinations. Pricing work, therefore, remained partly constrained by external data structures that were technically available but operationally difficult to use. This limited the ability of firms to translate supplier pricing into timely and usable quotations for customers.

Participants described a different situation after AISPS was introduced. Respondent A stated that

> *"Our system [AISPS] uses AI to source out pricing and generate it into a readable format before we upload it to their website."*

This suggests that the system improved the usability of wholesaler pricing information by converting complex pricing inputs into a form that could be operationalised within the firm's digital interface.

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Respondent A further noted that a printer without in-house machines could use the system to offer products from several wholesalers through one integrated platform, indicating a shift in how pricing data could be assembled and deployed in practice. These suggest that AISPS did not eliminate dependence on external pricing sources but reorganised how that information was processed and accessed within the firm and its immediate partner network. At the technological level, the system reformatted complex pricing data into a more usable structure. At the organisational level, this reduced reliance on manual interpretation and made pricing work more manageable in digitally mediated settings. In this case, the key change was not full pricing transparency in any broad market sense but improved operational access to complex pricing information.

5.3 Transition from Traditional to Digital Platforms

Interview data indicate that the transition from traditional to digital operations was closely tied to changes in pricing practice. Before digital integration became central to the business, pricing was embedded in a more manual intermediary workflow. As Respondent A explained, *"Initially, we just take order and pass it to another printer to do the job."* In this arrangement, pricing and production coordination depended heavily on human intervention, and quotation could be managed through direct communication rather than instant digital response. This approach became more difficult to sustain as online ordering practices expanded. Participants described a broader shift in customer behaviour, particularly during and after the pandemic, as more customers became accustomed to ordering through digital platforms. Respondent A noted that

> *"people still need printing. It's just that the way to get printing done has changed ... a lot of people are used to ordering online already."*

Under these conditions, pricing could no longer depend on slow back-and-forth clarification or manual checking without risking customer loss.

The need for faster quotation was expressed directly in the interview data. As Respondent A stated,

> *"By the time you wait too long for the price, the customer is already gone ... we offer live instant price selection."*

This suggests that the operational challenge was not only to digitise ordering, but also to ensure that pricing could function within that environment in real time. In this context, AISPS was described as enabling pricing logic to be embedded within the firm's digital workflow so that complex configurations could be priced without reverting to manual quotation for routine online transactions.

These accounts suggest that AISPS supported the firm's transition from a manually mediated pricing process toward a digitally mediated workflow. At the technological level, the system enabled real-time quotation within online ordering channels. At the organisational level, it reduced reliance on person-to-person coordination for routine pricing tasks. In this case, the transition to digital platforms was not simply a channel shift; it required pricing practice itself to be reorganised so that digital ordering could be sustained operationally.

5.4 AISPS through the Technology–Organisation–Environment (TOE)

At the technological level, AISPS addressed a central problem identified across the case: the difficulty of processing highly variable pricing inputs in a form that could support online configuration and quotation. Rather than replacing pricing work altogether, the system embedded pricing logic into digital interfaces and reformatted complex wholesaler data into a more usable structure. This supports prior research suggesting that the value of digital technologies in traditional industries depends not only on technical sophistication, but also on their compatibility with operational routines and decision processes (Tornatzky & Fleischer, 1990; Zhu et al., 2006; Horani et al., 2023).

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At the organisational level, the findings show that AISPS was significant because it changed how pricing work was coordinated inside the firm. Before adoption, pricing relied more heavily on human mediation, manual interpretation, and fragmented quotation practices. After implementation, pricing activity became more embedded in digital workflows, reducing the need to manually translate complex configurations into customer-facing offers. In this sense, the study extends pricing as an organisational capability by showing that pricing systems in highly customised settings do not simply improve efficiency; they also reorganise routine coordination across sales, production, and digital ordering processes (Dutta et al., 2003; Carr, 2008).

At the environmental level, the case shows that adoption pressures were shaped by dependence on wholesalers, price complexity, and the wider shift toward online ordering. These external conditions did not encourage digital adoption in general; they made pricing responsiveness an operational necessity. The findings therefore support earlier studies showing that technology adoption in traditional sectors is shaped by market pressure, interorganisational dependence, and the fit between digital systems and changing business conditions (Abebe, 2014; Bates et al., 2022; Kluczek et al., 2023). In the present case, AISPS became relevant not because AI was adopted as a stand-alone innovation, but because it addressed a specific coordination problem created by extreme customisation and digitally mediated service delivery.

Overall, the findings suggest that the contribution of AISPS in this case lies in the reorganisation of pricing practice rather than in any direct demonstration of superior pricing outcomes. The study does not claim broad market transformation beyond the evidence available. Instead, it shows how an AI-enabled pricing system can become embedded in everyday organisational routines and reshape how pricing complexity is processed, accessed, and operationalised within one highly customised service firm. This offers a bounded, practice-oriented contribution to research on AI adoption, digital transformation, and pricing systems in traditional industries.

6. CONCLUSION

This study examined how AISPS reshaped pricing practices within a highly customised commercial printing environment. Drawing on a qualitative single-case study, the findings show that AISPS became embedded in the firm's pricing work in three main ways: by reducing the complexity of online product listing, improving the usability of complex wholesaler pricing data, and supporting the shift from manual quotation to digitally mediated pricing workflows. Across these areas, the system did not remove product complexity itself but changed how that complexity was processed and managed in practice.

From the perspective of Technology–Organization–Environment framework, these changes reflected the interaction between system functionality, internal work organisation, and external market pressure. Technologically, AISPS enabled complex pricing inputs to be reformatted for digital use. Organisationally, it reduced reliance on manual interpretation and person-to-person coordination in routine pricing tasks. Environmentally, its relevance was shaped by dependence on wholesalers, intense pricing complexity, and the growing need for real-time quotation in online ordering settings.

The study contributes to research on AI adoption and digital transformation by showing how an AI-enabled pricing system can reorganise internal pricing practice in a traditional service industry characterised by extreme customisation. In this case, AISPS reorganised how pricing information was processed, accessed, and operationalised within the firm and its immediate partner network, rather than directly determining price outcomes.

Several limitations should be acknowledged. The study is based on a single case and draws primarily on three internal interviewees, supported by field observations and organisational artefacts. It does not include customers, wholesalers, competitors, or other external actors. For this reason, the findings are in relation to internal organisational change and case-based implications rather than wider market effects. Future research could examine comparable pricing systems across multiple firms or industries or explore how such systems evolve over time as digital ordering and pricing practices become more deeply integrated. Overall, the study provides a practice-oriented account of how pricing systems are adopted and used under

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conditions of extreme customisation. By focusing on the reorganisation of pricing work, it clarifies how AI-enabled systems may matter in traditional industries facing growing digital coordination demands.

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CONFLICT OF INTEREST STATEMENT

The author agree that this research was conducted in the absence of any self-benefits, commercial or financial conflicts and declare the absence of conflicting interests with the funders.

AUTHORS' CONTRIBUTIONS

The sole author, Muhammad Yusuf, conceptualised the central research idea, provided the theoretical framework, and designed the research. He conducted the research, wrote and revised the article, supervised the research progress, anchored the review and revisions, and approved the final article for submission.

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