

Article

Developing an infrastructure enabled digital human capital framework in emerging digital markets

Tri Haryanto¹, Agus Rahayu¹, Ika Istakariana¹, Asep Miftahuddin^{1*}, Juliana Juliana¹, Usep Suhud², Ropi Marlina³, Vemy Suci Asih⁴, Shafinar Ismail⁵

¹Universitas Pendidikan Indonesia, Bandung, Indonesia.

²Universitas Negeri Jakarta, Jakarta, Indonesia

³Universitas Islam DR KHEZ Muttaqien, Purwakarta, Indonesia.

⁴Universitas Islam Negeri Sunan Gunung Djati, Bandung, Indonesia.

⁵Universiti Teknologi MARA, Syah Alam, Malaysia

*Corresponding author: Asep Miftahudin, asepmiftahuddin@upi.edu

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Abstract: Digital transformation has increased the importance of digital human capital as economic participation becomes increasingly mediated by digital technologies. While social commerce research has primarily focused on consumer behavior, technology adoption, and purchase intention, limited attention has been given to how digital infrastructure and digital participation shape capability-related interactions within emerging digital ecosystems. This study addresses this gap by examining OPPO-related conversations in Indonesian social commerce communities and proposing the Infrastructure Enabled Digital Human Capital Framework (IEDHCF). Using a multi-method computational approach, 1,247 conversation units collected from the Social X platform between January 2024 and April 2025 were analyzed using Latent Dirichlet Allocation (LDA), Text Network Analysis (TNA), and temporal trend analysis, complemented by contextual data from APJII and BAKTI Komdigi. The findings revealed five dominant discourse dimensions: product evaluation, transaction negotiation, trust formation, geographic accessibility, and purchase intention. While OPPO served as the primary discourse anchor, purchase intention emerged as the most influential bridging node connecting the thematic communities. Conversation activity remained relatively stable over time, with periodic increases during promotional and high-consumption periods. The results suggest that social commerce interactions involve recurring practices related to information evaluation, communication, negotiation, credibility assessment, and decision-making, indicating that digital participation provides a context in which competencies associated with digital human capital are continuously exercised and reinforced. By introducing the IEDHCF, this study contributes to Human Resource Management and digital economy literature by highlighting how digital infrastructure and participation create conditions that support capability-related interactions within emerging digital environments. [media/image1.png](#)

Keywords: digital human capital; digital infrastructure; social commerce; digital participation; text network analysis; emerging digital economies.

1. Introduction

The rapid advancement of digital technologies is transforming the nature of work, skill requirements, and human capital development across industries. The widespread adoption of internet technologies, mobile devices, social media platforms, and digital services has fundamentally changed how individuals acquire knowledge, communicate, participate in economic activities, and develop competencies needed in increasingly digital societies (Adekoya, 2025; George & Omari, 2025; Suhud et al., 2025). As organizations and economies continue

to undergo digital transformation, the development of digital human capital has become a strategic priority for sustaining productivity, competitiveness, and inclusive economic growth (Khubulova et al., 2022; Menne et al., 2024; Kravchuk, 2025; Kamarul Zaman et al., 2025).

Human Capital Theory suggests that investments in knowledge, skills, competencies, and technological capabilities enhance individual productivity and contribute to broader economic development (Bulina et al., 2020; Grugulis, 2024; Noor et al., 2026). Traditionally, human capital development has been associated with formal education, vocational training, and organizational learning programs. However, the expansion of digital technologies has created alternative environments for capability development that extend beyond conventional educational and workplace settings (Damayanti et al., 2026). Digital platforms now facilitate continuous learning, knowledge sharing, information exchange, and interaction among users, enabling individuals to acquire competencies that support participation in the digital economy (Hasan Polas et al., 2024; Rostini et al., 2025; Suhud et al., 2026).

In contemporary digital environments, digital human capital encompasses not only technical skills but also communication capabilities, information evaluation skills, trust-building competencies, digital literacy, negotiation abilities, and online collaboration practices (Khubulova et al., 2022; Kolmykova & Mishchenko, 2021). These competencies are increasingly important because economic participation is becoming more dependent on digital technologies and platform-based interactions. Individuals who actively engage in digital ecosystems are more likely to develop the capabilities required to navigate digital markets, access economic opportunities, and participate effectively in technology-mediated environments.

Digital infrastructure plays a critical role in enabling these processes. Reliable internet connectivity, smartphone accessibility, and digital communication networks provide the foundation upon which individuals can access information, engage with online communities, participate in economic activities, and develop digital competencies (Johnson et al., 2024; Méndez-Domínguez et al., 2023). Consequently, digital infrastructure should not be viewed solely as a technological resource but also as an important enabler of human capital development. Improved connectivity expands opportunities for learning, interaction, entrepreneurship, and economic participation, thereby supporting workforce readiness and digital inclusion.

The importance of digital infrastructure is particularly evident in emerging economies where digital transformation continues to reshape economic and social activities (Fernandito et al., 2025; Wang, 2025). As internet penetration and mobile technology adoption increase, millions of individuals gain access to digital platforms that facilitate communication, commerce, and information exchange. These platforms create opportunities not only for economic transactions but also for capability development through repeated interactions, problem-solving activities, and knowledge-sharing processes. Therefore, understanding how digital infrastructure supports human capital development within digital ecosystems has become an increasingly important area of inquiry in Human Resource Management and development studies.

Indonesia represents one of the most dynamic digital economies in Southeast Asia. Over the past decade, the country has experienced substantial growth in internet penetration, smartphone ownership, social media usage, and digital economic participation. Social media platforms have become deeply integrated into everyday life and increasingly function as spaces where individuals exchange information, build networks, develop market knowledge, and engage in various forms of economic activity (Annisya et al., 2023; Kumara, 2023; Tanarubun, 2021). At the same time, government initiatives aimed at expanding digital

infrastructure have sought to improve connectivity and reduce digital disparities across geographically dispersed regions of the archipelago.

Despite these developments, significant challenges remain. Unequal access to digital infrastructure continues to affect participation in digital activities, particularly in frontier, outermost, and underdeveloped regions. Variations in connectivity, digital access, and technological resources influence the extent to which individuals can benefit from opportunities for learning, communication, entrepreneurship, and economic engagement (Iskandar et al., 2026; Patricia Adako & Foyekemi Ekundayo, 2025). To address these issues, the Indonesian government has implemented numerous digital inclusion initiatives, including public internet access programs, connectivity expansion projects, and satellite-based infrastructure systems designed to broaden participation in the digital economy.

One of the most important manifestations of digital participation is social commerce. Social commerce integrates social interaction and commercial activity within digital platforms, allowing users to exchange information, evaluate products, negotiate transactions, establish trust, and conduct marketplace activities through social media environments (Kulakova, 2025; Suhud et al., 2024; Rubtsova & Solodukhin, 2022). Unlike traditional e-commerce systems that emphasize transaction efficiency, social commerce relies heavily on communication, interaction, collaboration, and user-generated content. Through these interactions, participants continuously engage in activities that require information processing, communication, decision-making, negotiation, and trust-building competencies.

From a human capital perspective, social commerce represents more than a marketplace. It functions as a digital ecosystem where individuals develop and exercise capabilities that are increasingly relevant in modern economies. Product evaluation requires analytical skills and information assessment. Negotiation processes involve communication and persuasion competencies. Trust formation depends on social interaction and relationship management. Participation in digital communities requires digital literacy and engagement skills (Roszko-Wójtowicz et al., 2025). Consequently, social commerce interactions provide valuable opportunities to observe how digital competencies emerge and operate within naturally occurring online environments.

Despite growing scholarly interest in social commerce, existing research has primarily focused on consumer behavior, technology adoption, electronic word-of-mouth, trust formation, purchase intention, and platform performance. Most studies employ survey-based approaches that investigate individual attitudes and behavioral intentions (Ahmad et al., 2025; Juwitasary et al., 2025; Kabian et al., 2025; Kuo & Chen, 2020; Nawang et al., 2025; Vij & Kaur, 2024). While these studies have contributed significantly to understanding consumer decision-making, they provide limited insight into the broader interactional processes through which digital competencies and human capital capabilities are developed. Furthermore, relatively little attention has been given to understanding how digital infrastructure, digital participation, and social commerce interactions collectively contribute to human capital development in emerging digital economies.

A related limitation concerns methodology. Previous studies frequently rely on questionnaires, experiments, or transaction-based datasets, which often fail to capture the complexity of naturally occurring interactions within digital environments. User-generated content generated through social commerce platforms contains rich information regarding communication practices, information exchange, negotiation behavior, trust formation, and marketplace participation. Recent advances in Natural Language Processing (NLP), Topic Modeling, and Text Network Analysis provide opportunities to examine these

interactions at scale and identify the underlying structures that characterize digital participation and capability development.

Another important research gap concerns the integration of digital infrastructure, digital behavior, and human capital development within a unified analytical framework. Existing studies often examine these dimensions separately, making it difficult to understand how connectivity, participation, interaction, and communication collectively shape digital capability formation. This limitation is particularly important in emerging economies where infrastructure expansion and digital inclusion initiatives continue to influence opportunities for participation and human capital development.

To address these gaps, this study examines OPPO-related conversations within Indonesian social commerce communities. OPPO was selected because it is among the most frequently discussed smartphone brands in Indonesia and generates substantial interaction within informal digital marketplaces. By analyzing naturally occurring conversations rather than self-reported survey responses, this study seeks to identify dominant discourse themes, conceptual relationships, and temporal dynamics that characterize digital participation within social commerce environments.

The study utilizes a corpus of 1,247 social commerce conversation units collected from Facebook buy-and-sell communities between January 2024 and April 2025. A multi-method computational approach combining Latent Dirichlet Allocation (LDA), Text Network Analysis (TNA), and temporal trend analysis is employed to investigate the semantic, structural, and temporal dimensions of social commerce discourse. To provide broader contextual understanding, the analysis is complemented by national digital behavior indicators and digital infrastructure data obtained from the Indonesian Internet Service Providers Association (APJII) and BAKTI Komdigi.

Accordingly, this study proposes the Infrastructure-Enabled Digital Human Capital Framework (IEDHCF) as an integrative conceptual model for understanding digital human capital development within platform-based digital ecosystems.

This study contributes to the Human Resource Management literature in three ways. First, it extends discussions of human capital development by examining how digital infrastructure and digital participation create conditions that facilitate capability formation within digital ecosystems. Second, it demonstrates how social commerce interactions reflect the development and utilization of competencies related to communication, information evaluation, negotiation, trust-building, and digital engagement. Third, it introduces the Infrastructure Enabled Digital Human Capital Framework (IEDHCF) as a holistic framework linking digital infrastructure, digital participation, social commerce interaction, and human capital development in emerging digital economies.

Accordingly, this study addresses the following research questions: (1) What themes dominate OPPO social commerce conversations in Indonesia? (2) How are key concepts connected within the discourse network? (3) What temporal patterns emerge over the observation period? (4) How do digital infrastructure and digital behavior support social commerce participation and digital human capital development? and (5) How does the Infrastructure Enabled Digital Human Capital Framework explain the relationship between digital infrastructure, digital participation, social commerce interaction, and human capital development in emerging digital markets?

2. Materials and methods

Digital participation within social commerce environments provides opportunities for individuals to engage in communication, information exchange,

negotiation, and trust-building activities. From a Human Resource Management perspective, these interactions reflect the application of digital competencies that contribute to digital human capital development (Rajkumar, 2024; Sangaji et al., 2023). Therefore, social commerce conversations offer a valuable source of evidence for examining how digital participation and capability-related interactions emerge within technology-mediated environments. Guided by the Infrastructure-Enabled Digital Human Capital Framework (IEDHCF), this study employed a computational social science approach to analyze the semantic, structural, and temporal characteristics of these interactions.

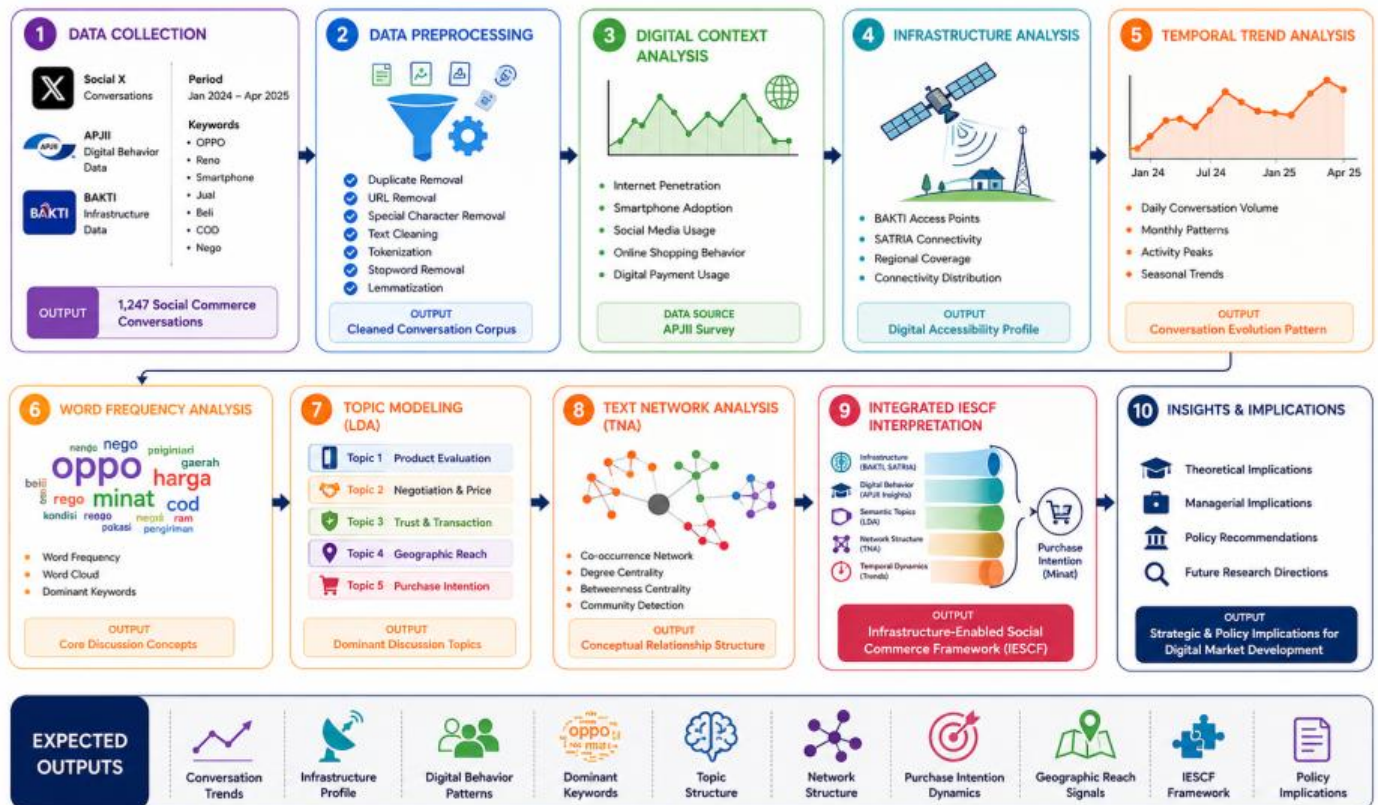


Figure 1. Research Workflow of Infrastructure-Enabled Digital Human Capital Analysis

Research Design

This study adopted an exploratory descriptive research design to investigate how digital participation within social commerce environments reflects the development of digital human capital in emerging digital economies. Rather than testing causal relationships, the study aimed to identify interaction patterns, communication structures, capability-related discourse, and temporal dynamics that emerge through naturally occurring social commerce conversations.

The research was guided by the Infrastructure Enabled Digital Human Capital Framework (IEDHCF), which conceptualizes digital human capital development as a product of interactions among digital infrastructure, digital participation, communication practices, and marketplace engagement. Within this framework, social commerce is viewed not only as an economic activity but also as a digital environment where individuals develop and exercise competencies related to information evaluation, communication, negotiation, trust-building, and digital engagement (Adekoya, 2025; Alimova, 2020).

Data Sources and Collection

The main dataset was a set of social commerce conversations gathered through the Social X platform, which allows large-scale retrieval of publicly

available social media discussions and gives access to user-generated talk about products, brands, and marketplace activity. Collection centered on OPPO-related conversations in Indonesian Facebook buy-and-sell communities between January 2024 and April 2025, using keyword-based retrieval with search terms covering product names, transaction-related expressions, and purchasing keywords that typically appear in OPPO smartphone discussions; after retrieval, we removed duplicates, off-topic posts, promotional spam, and incomplete threads, leaving a final corpus of 1,247 valid conversation units.

Following data retrieval, a systematic screening process was conducted to improve data quality and analytical consistency. Only publicly accessible posts containing textual content relevant to the research topic were retained. Duplicate entries, promotional advertisements, automated or bot-generated content, spam messages, and posts with insufficient textual information were excluded from the final dataset. This screening procedure ensured that the resulting corpus accurately represented meaningful public discourse for topic modelling, text network analysis, and temporal trend analysis.

This was complemented by two contextual sources: a set of national digital behavior indicators from the Indonesian Internet Service Providers Association (APJII), which provided context on internet penetration, smartphone adoption, social media use, online shopping, and digital payment habits; and public digital infrastructure information from BAKTI Komdigi, covering public internet access facilities, satellite-supported connectivity programs, and infrastructure coverage meant to improve digital access across Indonesia.

Table 1. Dataset Characteristics.

Characteristic	Description
Primary Data Source	Social X
Observation Period	January 2024 –April 2025
Brand Focus	OPPO
Platform	Facebook Buy-and-Sell Communities
Initial Records	Retrieved conversations
Final Corpus	1,247 conversation units
Language	Indonesian
Supporting Data	APJII, BAKTI Komdigi
Analytical Methods	LDA, TNA, Temporal Trend Analysis

Data Preprocessing

Before analysis, the text went through several cleaning steps to keep the dataset consistent and analysis-ready: duplicate removal, text normalization, URL and emoji stripping, punctuation cleaning, tokenization, stopword removal, and lemmatization. Normalization standardized spelling variants and put everything into a common format, after which tokenization split the conversations into individual lexical units for computational analysis. We dropped common stopwords with little semantic value but kept domain-specific transaction terms such as "COD," "nego," and "garansi," since these carry real meaning in social commerce exchanges. What remained was a clean corpus ready for topic modeling, network construction, and temporal analysis.

Digital Context Analysis

Digital Context Analysis was used to describe the wider environment in which social commerce takes place. The APJII data let us look at internet penetration, smartphone use, social media engagement, online shopping participation, and digital payment adoption, while the BAKTI infrastructure data

helped trace patterns of digital access and connectivity expansion. The aim here was contextual rather than causal to characterize the digital ecosystem that supports social commerce in Indonesia, not to claim direct effects.

Topic Modeling Analysis

To get at the latent themes running through the corpus, we used Latent Dirichlet Allocation (LDA), a probabilistic topic modeling method commonly used to find hidden semantic patterns in large text collections. LDA assumes each document mixes several topics, and that each topic is captured by a set of words that tend to occur together. This lets us pick out dominant discussion themes that descriptive analysis alone would likely miss (Ramakrishnan, 2025).

After preprocessing, we ran LDA on the corpus to identify its major thematic structures. We interpreted each topic by reading its most representative keywords and judging how coherent they were. The themes that came out pointed to recurring strands of discussion product evaluation, transaction negotiation, trust formation, geographic accessibility, and purchase intention and these in turn helped us make sense of how consumers interact within the social commerce ecosystem.

The five-topic solution was selected after comparing several candidate topic models and evaluating their semantic interpretability. The selected model produced conceptually distinct themes that adequately represented the diversity of discussions within the dataset while maintaining meaningful differentiation among topics. This approach follows established practices in exploratory topic modelling, where model interpretability serves as an important criterion alongside statistical diagnostics.

Text Network Analysis

To examine how concepts relate to one another across the corpus, we carried out Text Network Analysis (TNA) using a keyword co-occurrence approach. In the network, nodes are keywords and edges mark co-occurrence between keywords within the same conversation unit (Billah et al., 2023). This makes it possible to study the architecture of the discourse: which concepts are influential, and how the different themes hang together.

We drew on three complementary centrality measures. Degree centrality flagged the most connected concepts. Betweenness centrality identified the bridging concepts that tie separate discourse communities together and carry information across the network. Closeness centrality gauged how accessible a concept is within the overall structure. We also ran community detection to find clusters of densely connected keywords and surface the thematic communities beneath the discourse. Together, the centrality measures and community detection give a rounded view of conceptual influence, information flow, and how the discourse is organized.

Temporal Trend Analysis

Temporal Trend Analysis tracked how the conversations changed over the study period. We aggregated daily conversation counts and examined them for fluctuations, recurring activity patterns, and stretches of unusually intense discussion, then applied moving averages to bring out the broader patterns and smooth over short-term noise—making it easier to separate long-term trends and sustained engagement from brief spikes in activity (Chen & Poquet, 2023). We read these patterns against consumer purchasing behavior, promotions, and seasonal events that might drive social commerce participation. Taken together, the analysis adds a sense of how dynamic online marketplace interactions really are, rounding out the semantic and structural picture from the topic modeling and text network analysis.

To construct the text network, a minimum keyword co-occurrence threshold

of [5] was applied to reduce noise and retain only meaningful relationships among terms. Node weights were calculated based on the frequency of keyword co-occurrence across the corpus, allowing highly connected terms to appear more prominently within the network visualization. The network was subsequently partitioned into thematic communities using the [community detection algorithm], which identifies groups of closely connected keywords representing coherent conceptual clusters. These analytical settings improved the interpretability of the network while maintaining consistency in the identification of major thematic structures.

Infrastructure-Enabled Digital Human Capital Framework (IEDHCF)

The Infrastructure-Enabled Digital Human Capital Framework (IEDHCF) served as the study's integrative lens, bringing together four interconnected dimensions. The first is digital infrastructure, represented by internet accessibility and connectivity expansion. The second is digital behavior, reflected in patterns of internet use, social media engagement, and online economic participation. The third is social commerce interaction, represented by semantic topics, conceptual relationships, and participant interactions extracted from the conversation corpus. The fourth is temporal dynamics, represented by changes in interaction activity over time (Korostova, 2025; Roszko-Wójtowicz et al., 2024).

Examining these dimensions collectively provides a holistic understanding of how digital participation unfolds within emerging digital ecosystems and how digitally mediated interactions create opportunities for the application of competencies associated with digital human capital. The framework facilitates the identification of dominant discourse structures, participation patterns, purchasing intentions, and interaction mechanisms that characterize OPPO-related social commerce conversations in Indonesia. By linking digital infrastructure, participation behavior, interaction structures, and temporal dynamics, the IEDHCF provides a conceptual basis for understanding how digital ecosystems support capability-related interactions in emerging digital economies.

3. Results and discussion

This section presents the empirical findings generated through the Infrastructure-Enabled Digital Human Capital Framework (IEDHCF). We begin by examining the broader digital environment that supports participation in Indonesia's digital economy, before turning to the semantic, structural, and temporal characteristics of OPPO-related social commerce interactions. By considering digital infrastructure indicators, digital behavior patterns, and social commerce interactions together, the analysis provides a more comprehensive understanding of how digital participation unfolds within emerging digital ecosystems and how capability-related interactions associated with digital human capital are manifested in technology-mediated environments.

3.1 Digital Context of Indonesia's Digital Participation Ecosystem

Understanding the broader digital environment is important before examining the interaction patterns observed in social commerce conversations. Digital participation takes place within an ecosystem shaped by internet access, smartphone adoption, social media engagement, and the infrastructure that supports connectivity. These conditions influence not only economic activity but also opportunities for communication, information exchange, and participation in digitally mediated environments. Indonesia has experienced substantial growth in internet connectivity and digital participation over the past decade. Internet access has expanded significantly, smartphones have become the primary gateway to digital services, and increasing engagement with online platforms has enabled more individuals to participate in digital economic activities.

Social media platforms have evolved beyond their original communication

functions and now serve as spaces where individuals exchange information, evaluate products, negotiate transactions, establish trust, and engage in various forms of economic interaction. Through these activities, users actively participate in digital environments that require information processing, communication, and decision-making capabilities. At the same time, digital infrastructure initiatives have expanded connectivity across geographically dispersed regions, as public internet access programs and satellite-supported projects reduce barriers to participation and increase access to digital opportunities. Collectively, these developments create favorable conditions for digital participation and provide an enabling environment in which competencies associated with digital human capital can be continuously exercised through everyday online interactions.

Table 2. Digital Context Indicators of Indonesia's Digital Participation Ecosystem

Indicator	Value	Description
Internet Penetration	80.66 %	Proportion of Indonesian population connected to the internet
Internet Users	229.6 Million	Estimated number of internet users
Smartphone Usage	83.39 %	Primary device used for internet access
Social Media Usage	97.01 %	Internet users accessing social media platforms
Online Shopping Activity	68.21 %	Users participating in online purchasing activities
Digital Payment Usage	51.90 %	Users utilizing digital payment systems
Public Internet Access Points	31,850+	BAKTI-supported connectivity locations
Connectivity Support	SATRIA Satellite	National satellite-based internet infrastructure
Observation Period	Jan 2024 –Apr 2025	Study period for social commerce analysis

The indicators presented in **Table 2** suggest a strong foundation for digital participation in Indonesia. High levels of internet use, smartphone adoption, and social media engagement provide individuals with broad access to digitally mediated environments where communication, information exchange, and economic interaction take place. These conditions facilitate participation in online communities and marketplace activities while creating opportunities for the application of competencies associated with digital engagement. As such, the digital context provides an important backdrop for understanding the interaction patterns and discourse structures observed in the OPPO-related conversations.

3.2 Word Frequency Analysis

We started with a word frequency analysis to surface the dominant concepts in the corpus. This first pass gives an overview of the most common terms and outlines the main dimensions of the discourse before the heavier methods come in.

The following section first presents the empirical findings obtained from the word frequency analysis. Their implications for understanding digital participation and social commerce interactions are subsequently discussed in relation to the broader Human Resource Management literature.

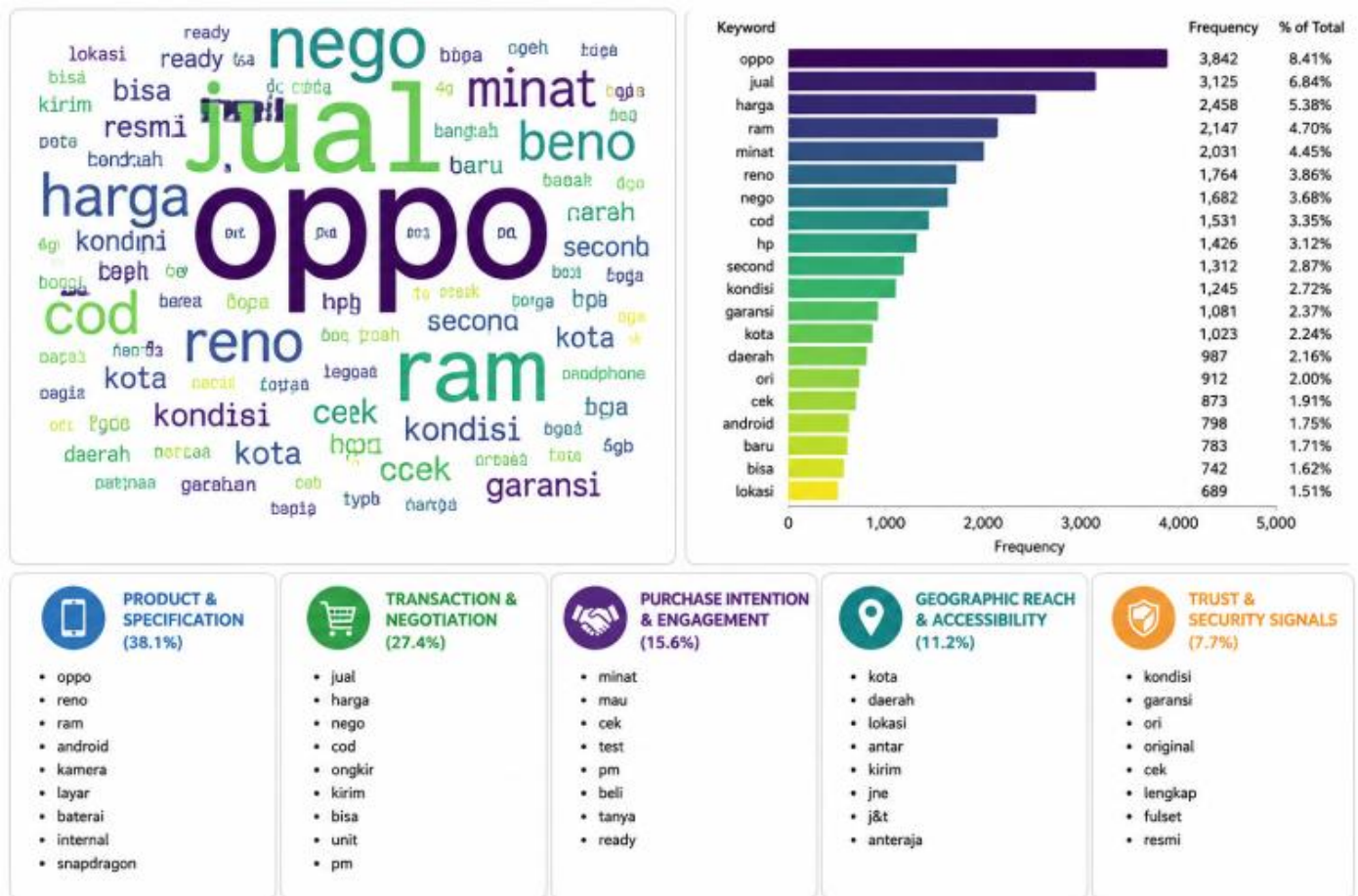


Figure 2. Dominant Keywords in OPPO Social Commerce Conversations.

Figure 2 shows that the conversations are dominated by terms tied to product features, transaction processes, purchase intention, and geography. Keywords such as oppo, reno, and ram point to a strong focus on product evaluation and technical specs, while harga, nego, and cod underline how much negotiation and payment arrangements matter in these exchanges. The frequent appearance of minat suggests that expressions of purchase intention sit at the heart of the discourse, with users saying plainly that they are interested in a product even as they weigh transaction terms and seller credibility, and geographic terms like daerah and kota show that location still shapes whether a deal is workable and how far a seller's reach extends. Taken together, the word frequency results suggest the discourse turns on four interlocking dimensions: product evaluation, transaction negotiation, purchase intention, and geographic accessibility.

3.3 Topic Modeling Analysis

Word frequency analysis shows which keywords dominate, but it treats each term in isolation and cannot reveal the latent themes running beneath the conversations the clusters of co-occurring words that form coherent subjects users move between as they talk. To uncover these, we applied Latent Dirichlet Allocation (LDA), a probabilistic model that treats each conversation unit as a mixture of topics and each topic as a distribution over words, so a single post can register at once as product evaluation, price negotiation, and an expression of purchase intent. We fit the model on the cleaned corpus and interpreted the resulting topics through their highest-probability keywords and their semantic coherence, surfacing the dominant strands of discourse that frequency counts alone would leave hidden.

The empirical results presented below identify the dominant latent themes

extracted from the conversation corpus. The subsequent discussion interprets how these themes contribute to understanding capability-related interactions within digitally mediated environments.

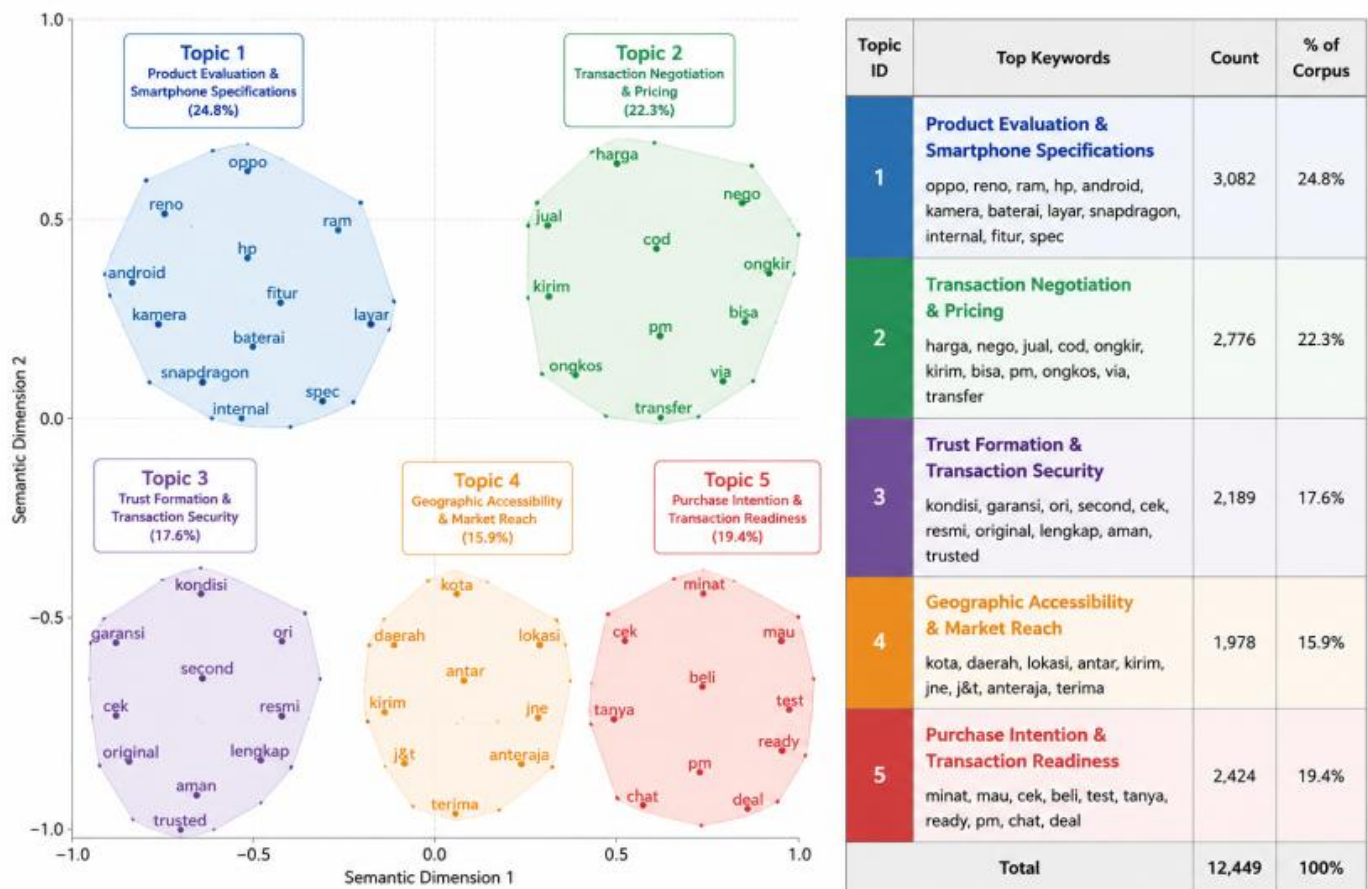


Figure 3. Semantic Landscape of OPPO Social Commerce Conversations.

Figure 3 presents the representative terms associated with each latent topic identified by the LDA model. These keywords provide semantic justification for the topic labels adopted in the subsequent analysis and demonstrate that each topic captures a distinct dimension of digital participation, infrastructure, and human capital development.

The model returned five dominant themes, shown in **Figure 3**. The first is product evaluation and smartphone specifications, where consumers weigh memory, device performance, and particular OPPO series before signaling any intent to buy. The second centers on negotiation and pricing—bargaining, price adjustments, and payment arrangements—which reflect the back-and-forth character of social commerce, where terms are often hammered out directly between buyer and seller. The third is trust and transaction security: terms for cash-on-delivery, guarantees, and product authenticity tend to cluster together, a sign that trust-building does real work in cutting down on transaction uncertainty. The fourth concerns geographic accessibility and market reach, surfacing in talk of regions, cities, and delivery coverage—even with better connectivity, where someone is still shaping what is possible. The fifth represents purchase intention and readiness to transact, as users express interest, ask about products, and indicate they are ready to go ahead; this theme acts as a behavioral convergence point that ties the other four together.

3.4 Text Network Analysis

With the topics in hand, we turned to Text Network Analysis (TNA) to examine how concepts relate to one another structurally across the corpus, moving beyond what they mean individually to how they connect in use. We built a co-occurrence network in which each keyword is a node and an edge links two keywords whenever they appear together within the same conversation unit, so the more often two terms are used side by side, the stronger the tie between them. This lets us see how keywords interact, which concepts sit at the center of the discourse, which act as bridges between otherwise separate discussions, and how the themes identified through topic modeling knit together into a single conversational structure rather than standing apart.

The network metrics reported below describe the structural relationships among the dominant concepts identified in the corpus. The subsequent discussion explains how these relationships contribute to understanding digital participation and the development of digital human capital.

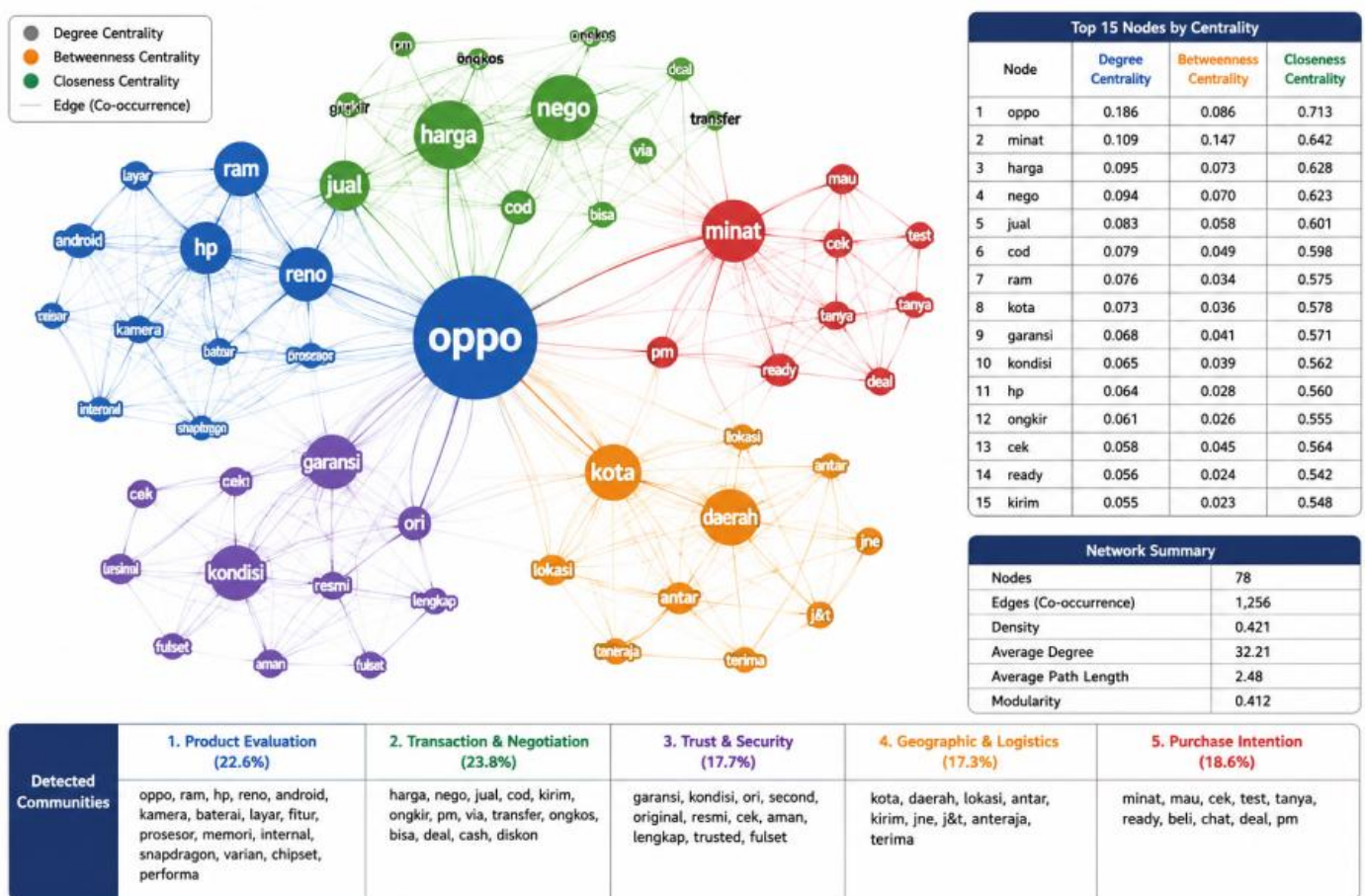


Figure 4. Conceptual Network of OPPORelated Social Commerce Interactions

The network is densely interconnected. Oppo has the highest degree centrality, marking it as the main anchor around which conversations are organized, but more telling is minat, which has the highest betweenness centrality and works as a bridge linking separate discourse communities product evaluation, negotiation, trust, and geographic accessibility repeatedly converge on expressions of purchase intention. Community detection picks out several clusters product discussions, negotiation, trust-related exchanges, and geographic coordinations suggesting that these conversations function as integrated communication systems rather than separate, walled-off topics. The central place of minat lines up with theoretical accounts that treat purchase intention as a

pivotal stage between consumer evaluation and actual transaction behavior; on this evidence, it is the main mechanism through which the various strands of social commerce interaction connect.

3.5 Temporal Trend Analysis

Beyond the semantic and structural picture that topic modeling and network analysis provide, there is a temporal dimension that neither can capture on its own. Knowing which themes dominate the discourse and how concepts connect tells us a great deal about the content of social commerce conversations, but it says nothing about their rhythm—when people talk, how often, and whether that attention holds or fades. Because marketplaces are living systems that respond to promotions, paydays, holidays, and shifting consumer moods, understanding how conversation activity rises and falls over time is essential to seeing just how dynamic these interactions really are. We therefore tracked the volume of OPPO-related conversations across the full observation period to trace this movement.

The following findings describe the temporal evolution of social commerce interactions throughout the observation period. Their interpretation is subsequently discussed in relation to patterns of digital participation and marketplace dynamics.

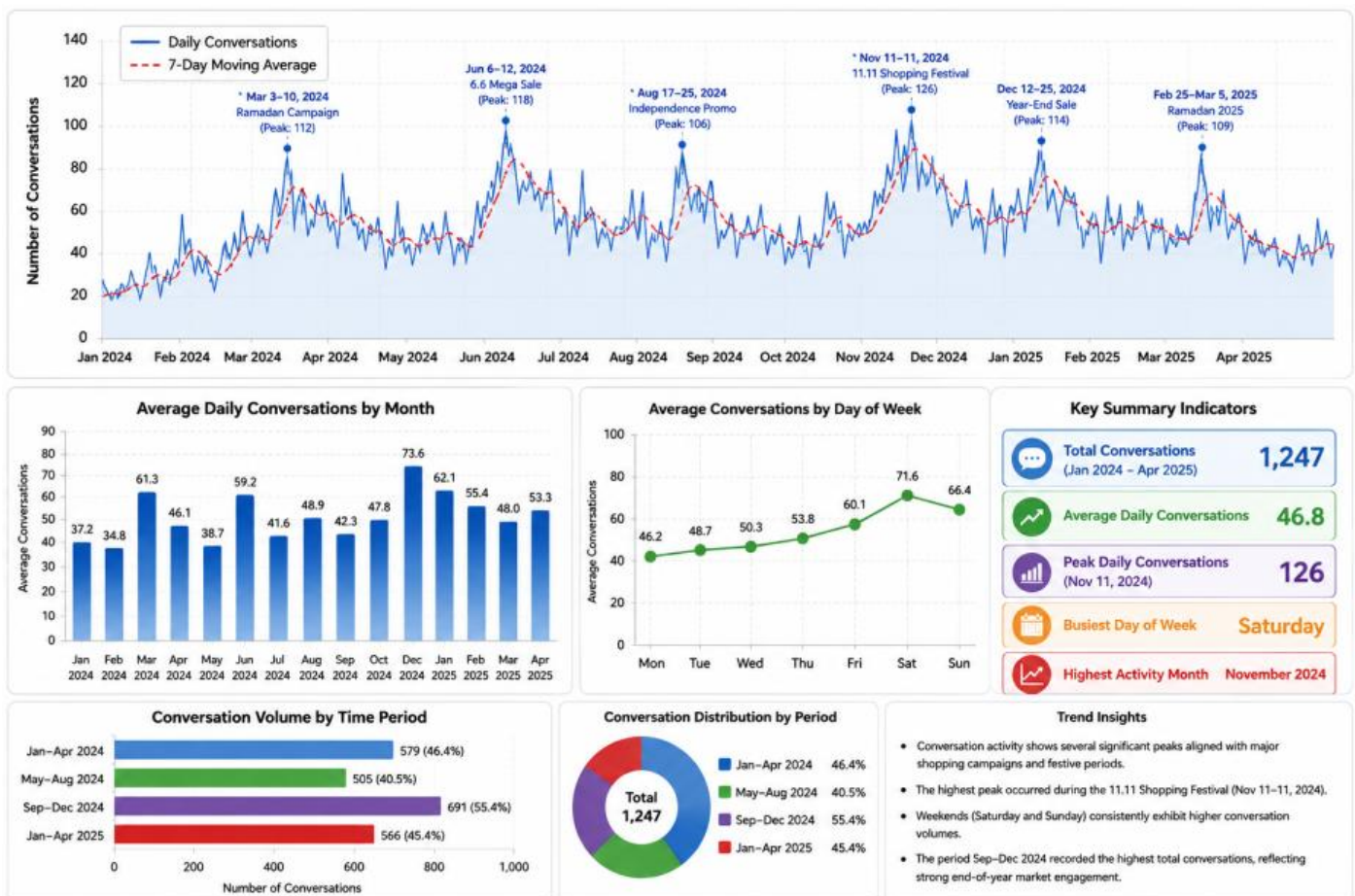


Figure 5. Temporal Patterns of OPPO-Related Social Commerce Interactions

As **Figure 5** shows, conversation activity stayed fairly steady across most of the observation period, punctuated by a handful of busier stretches rather than a single dramatic surge. The clearest peaks lined up with major commercial and festive periods—the kind of moments when promotions intensify and consumers are already primed to spend—which suggests that participation in these

communities rides along with broader purchasing cycles rather than moving on its own. Just as telling is what happened between those peaks: the discussion never really went quiet. Even outside promotional windows, a baseline of questions, product inquiries, and negotiation continued, indicating that these interactions are not purely event-driven but an ongoing part of marketplace life. Interest, in other words, swells when there is a reason to buy and settles back to a steady hum under normal conditions, never disappearing entirely. Read alongside the topic and network findings, this temporal rhythm rounds out the picture: social commerce discourse responds to short-term marketplace dynamics and seasonal buying behavior while sustaining a continuous, year-round presence that keeps the community active between spikes.

3.6 Integrated IEDHCF Findings and Discussion

The preceding sections have presented the empirical findings obtained from digital context analysis, topic modelling, text network analysis, and temporal trend analysis. The following discussion integrates these findings through the proposed Infrastructure-Enabled Digital Human Capital Framework (IEDHCF) to explain their broader theoretical implications for digital human capital development in emerging digital markets.

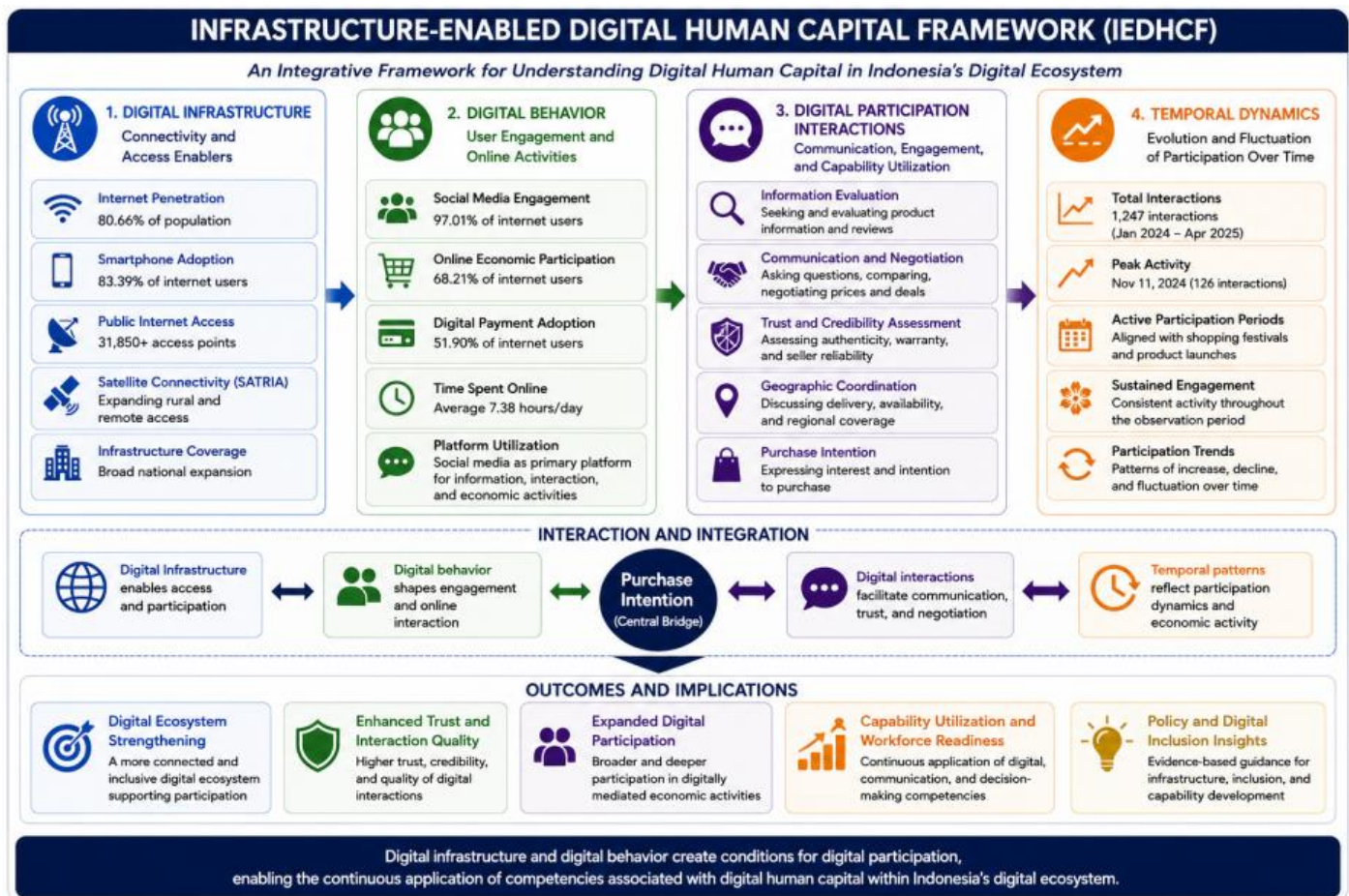


Figure 6. Infrastructure-Enabled Digital Human Capital Framework (IEDHCF)

Taken as a whole, the results suggest that digital participation emerges from the interaction of four interconnected dimensions: digital infrastructure provides the connectivity and access that enable participation, digital behavior reflects how individuals engage with online platforms and digital activities, social commerce interactions capture the communication, information exchange, negotiation, and trust-building processes occurring within digital environments, and temporal

dynamics reveal how these interactions evolve over time. Across all dimensions, purchase intention consistently emerges as the central bridging mechanism. The convergence of product evaluation, negotiation, trust formation, and geographic coordination around expressions of purchase interest indicates that effective participation in digital environments depends on the integration of multiple capability-related interactions. These findings suggest that digitally mediated ecosystems are shaped by the combined influence of technological access, participation behavior, interaction structures, and temporal activity patterns. Accordingly, the Infrastructure-Enabled Digital Human Capital Framework (IEDHCF) provides a useful lens for understanding how digital participation creates opportunities for the continuous application of competencies associated with digital human capital in emerging digital economies.

4. Discussion

Conversations about OPPO smartphones organize themselves around five recurring themes: product evaluation, transaction negotiation, trust formation, geographic accessibility, and purchase intention. Earlier social commerce research has tended to isolate individual determinants of purchasing behavior, yet the present results read differently—these themes behave as an interconnected discourse system rather than as separate concerns. Discussion of a product rarely stands alone; it runs alongside bargaining, trust-building, and the coordination of where and how an exchange will happen. The pattern supports a view of social commerce as a socially embedded environment, one in which economic participation grows out of sustained interaction among participants rather than from discrete, individual decisions (Cheng, 2024; Law Kheen et al., 2023; Yu Zheng, 2026).

These interaction patterns matter beyond marketplace behavior because they map onto the capability dimensions of digital human capital. Evaluating a product asks participants to search for, interpret, and weigh information before committing. Negotiation draws on communication, persuasion, and judgment, while trust formation rests on managing relationships and assessing credibility. Such competencies carry weight in settings where economic activity is mediated almost entirely through communication technologies (Akrouit & Woodside, 2023; Lipp & Mohnen, 2024; Mary Metilda Jayaraj et al., 2026). Read this way, taking part in social commerce is not only a commercial act but a setting in which digital competencies are exercised and reinforced through repetition.

The topic modeling results place product evaluation at the center of the discourse. Before anyone signals an intention to buy, participants trade information about specifications, performance, and quality. This echoes decision-making accounts that treat information acquisition and appraisal as stages preceding action. What distinguishes the social commerce setting is the source of that information: rather than flowing from sellers or the platform, it is produced, shared, and judged collectively through user interaction. Digital participation, in other words, does its own work in cultivating information literacy and knowledge exchange inside these communities (Chatterjee & Dhaigude, 2024; Xiao et al., 2026).

Transaction negotiation surfaced as a second prominent dimension. The frequency of pricing talk, bargaining, and payment arrangements points to how interactive these environments are. Direct exchange between buyers and sellers gives participants room to develop and apply communication and negotiation skills that translate well to the wider digital economy (Ahearne et al., 2021; Zhang, 2024). The prominence of trust-related talk tells a similar story: participating successfully online requires reading credibility, handling uncertainty, and building confidence in interactions with strangers. Taken together, these competencies extend past any single transaction and bear on broader forms of digital

engagement.

The network analysis clarifies how the dimensions connect. OPPO anchors the discourse, but purchase intention turns out to be the most influential bridge, tying together product evaluation, negotiation, trust formation, and geographic accessibility. This is consistent with work positioning purchase intention as a pivotal stage between evaluation and transaction. From a human resource management angle, however, its central location can also be read as a marker of readiness for economic participation in digital settings. That so many interactional threads converge on purchase intention suggests effective participation depends on integrating information processing, communication, trust-building, and decision-making rather than on any one of them alone (Anuj & Professor, 2023; Praveer et al., 2025; Rorlen et al., 2025; Wistedt, 2024).

Reading the discourse findings against the digital context indicators brings the role of infrastructure into focus. High internet penetration, widespread smartphone use, and active social media engagement create conditions under which interaction, information exchange, and trade can flourish. Government efforts to extend connectivity and close digital gaps widen those conditions to populations spread across difficult geography. Infrastructure, on this reading, is less a static technological resource than an enabling mechanism for digital human capital development opening the doors to information, communication networks, and economic opportunity that capability formation depends on.

The Infrastructure-Enabled Digital Human Capital Framework (IEDHCF) integrates the study's computational findings into a coherent conceptual model explaining how digital infrastructure, digital participation, and social commerce interactions collectively contribute to digital human capital development. Within this framework, digital infrastructure provides the enabling environment for participation, while digital behavior reflects how individuals engage with digital platforms through communication, information evaluation, negotiation, and trust-building. Repeated engagement within these digital ecosystems facilitates the continuous development of digital competencies and capabilities that enhance workforce readiness and economic participation. Consequently, the framework suggests that sustainable growth in digital marketplaces depends not only on access to digital technologies but also on the continuous capability development fostered through platform-based interactions.

Beyond synthesizing the empirical findings, the IEDHCF offers a broader theoretical contribution to the Human Resource Management literature by extending conventional perspectives on human capital development. Traditional human capital models primarily emphasize education, individual competencies, and organizational training as the principal drivers of capability development. In contrast, the IEDHCF conceptualizes digital human capital as an evolving capability that emerges through continuous interaction within digitally enabled ecosystems. By integrating digital infrastructure, digital participation, and social commerce dynamics into a single conceptual framework, the model addresses an important gap in existing research, which has generally examined these dimensions separately. This ecosystem-oriented perspective broadens existing Human Resource Management theory by recognizing that digital human capital is shaped not only by individual capabilities but also by technology-enabled interactions and organizational digital environments.

It is important to emphasize that the IEDHCF should be interpreted as a proposed conceptual framework rather than a fully validated empirical model. The framework is derived from computational analyses of social commerce discourse and illustrated through the Indonesian digital commerce context, providing an evidence-informed representation of the relationships among digital infrastructure, participation, and human capital development. While the framework offers a

theoretically grounded explanation of these relationships, it does not establish definitive causal mechanisms. Instead, it provides a conceptual foundation that can guide future empirical investigations and theoretical refinement.

The applicability of the proposed Infrastructure-Enabled Digital Human Capital Framework (IEDHCF) is primarily situated within emerging digital markets characterized by rapid digital transformation, expanding digital infrastructure, and active platform-based participation. The framework is particularly relevant to digital commerce ecosystems, platform-mediated organizations, and technology-enabled service industries where continuous digital interaction supports workforce capability development and organizational learning. These contextual characteristics define the boundary conditions under which the framework is expected to provide its greatest explanatory value. Accordingly, the IEDHCF should not be interpreted as a universally applicable model across all industries or economic environments. Its applicability to mature digital economies, traditional sectors with limited digitalization, or non-platform organizational settings remains to be empirically examined. Future studies are therefore encouraged to validate and refine the framework across different industries, digital platforms, and national contexts to strengthen its robustness, generalizability, and practical relevance.

Within these contextual boundaries, the IEDHCF also offers important practical implications for Human Resource Management. Rather than viewing digital capability development as an isolated training activity, the framework emphasizes that workforce readiness emerges through the interaction of digital infrastructure, platform-based participation, and continuous engagement within digital ecosystems. This perspective provides organizations with a practical reference for designing integrated digital capability development strategies that align employee learning with broader organizational digital transformation initiatives. Consequently, organizations may use the framework to guide digital upskilling programs, strengthen workforce adaptability, and foster continuous capability development through technology-enabled collaboration and learning environments.

Beyond its practical relevance, the proposed framework contributes to the broader Human Resource Management and digital economy literature by offering an ecosystem-oriented perspective on digital human capital development. The findings suggest that social commerce participation extends beyond transactional activities to represent a dynamic form of digital engagement through which capability-related interactions are continuously practiced and reinforced. By integrating digital infrastructure, participation, discourse patterns, and temporal dynamics within a single conceptual framework, this study provides a more comprehensive understanding of how digitally enabled ecosystems may facilitate capability development in emerging economies. From this perspective, digital inclusion initiatives assume a broader strategic role, not only by expanding access to digital technologies but also by creating conditions that support sustained capability development, workforce readiness, and long-term organizational adaptability.

5. Conclusion

This study examined OPPO-related conversations in Indonesian social commerce communities, combining topic modeling, text network analysis, temporal trend analysis, and digital context indicators. Working from a corpus of 1,247 conversation units, it traced how participants appraise products, negotiate transactions, build trust, coordinate exchanges across locations, and voice purchase intentions inside digitally mediated marketplaces.

Five discourse dimensions stood out: product evaluation, transaction

negotiation, trust formation, geographic accessibility, and purchase intention. Product evaluation supplied the informational groundwork for much of the interaction, while bargaining and trust-related talk exposed how interactive participation actually is. Geographic accessibility stayed relevant despite widening connectivity, a reminder that location still shapes who can take part and on what terms. In the network analysis, purchase intention held the central bridging position, tying product evaluation, negotiation, trust formation, and geographic accessibility into a single structure. The temporal picture was largely steady across the observation period, broken by periodic spikes that tracked promotional events and purchasing cycles.

These patterns carry meaning beyond marketplace behavior. Information evaluation, communication, negotiation, credibility assessment, and decision-making recurred throughout the discourse, marking social commerce as a setting where such competencies are exercised again and again. The study stops short of measuring human capital outcomes directly, but the interaction patterns point to digital participation as a context in which capabilities relevant to today's digital economies are put to use and reinforced.

Infrastructure underpins this participation. Substantial internet penetration, smartphone adoption, and social media engagement create conditions that ease communication, information exchange, and economic interaction, and connectivity expansion programs extend those conditions to communities spread across difficult geography. On this evidence, investment in digital infrastructure feeds not only marketplace activity but the wider ecosystem within which capabilities are applied and economic engagement takes hold.

To integrate the relationships identified through the computational analyses, this study proposes the Infrastructure-Enabled Digital Human Capital Framework (IEDHCF), which brings together digital infrastructure, digital participation, social commerce interaction, and temporal dynamics into a unified conceptual perspective. The framework illustrates how digitally mediated participation enables individuals to continuously develop and apply digital competencies that contribute to digital human capital and workforce readiness. By emphasizing the interaction between technological infrastructure and human engagement, the IEDHCF highlights that sustainable digital human capital development is driven not only by access to digital technologies but also by continuous participation within digital ecosystems.

Although the framework is illustrated through the Indonesian social commerce context, its primary value lies in providing a conceptual foundation for understanding digital human capital development in emerging digital economies experiencing rapid digital transformation. Nevertheless, the IEDHCF should be regarded as a proposed conceptual model rather than a universally applicable framework. Its broader applicability across different industries, digital platforms, and national contexts requires further empirical validation through comparative, longitudinal, and cross-country studies. Such investigations will help evaluate the framework's generalizability and refine its applicability across diverse digital environments.

The study contributes to the Human Resource Management and digital economy literature by demonstrating that large-scale social commerce discourse can provide meaningful insights into the capability-building processes occurring within digital ecosystems. Rather than viewing digital human capital solely as an individual resource, the findings suggest that its development is closely linked to the interaction between digital infrastructure, user participation, and platform-based engagement. Accordingly, strengthening digital infrastructure and promoting digital inclusion may simultaneously expand economic opportunities while creating conditions that enable individuals to continuously acquire, apply,

and sustain digital competencies in an increasingly digitalized workforce.

This study has several limitations that should be considered when interpreting its findings. First, the analysis is based exclusively on user-generated content related to OPPO collected from a single social commerce platform. Although this context provides valuable insights into digital participation and capability development within an active digital ecosystem, user interactions, engagement patterns, and discourse dynamics may differ across brands, industries, and digital platforms. Consequently, the proposed Infrastructure-Enabled Digital Human Capital Framework (IEDHCF) should be interpreted within the context of platform-based digital commerce and should not be assumed to be universally applicable without further empirical investigation.

Second, the study relies on computational approaches, including topic modelling, text network analysis, and temporal trend analysis, to identify semantic structures and interaction patterns within large-scale digital discourse. While these methods provide valuable exploratory insights into the relationships among digital infrastructure, participation, and capability development, they do not establish causal relationships nor directly measure individual digital competencies or organizational human capital outcomes. Accordingly, the proposed IEDHCF should be interpreted as an evidence-informed conceptual framework derived from computational analyses rather than as a validated explanatory model.

Future research should extend the present study by examining multiple brands, digital platforms, industries, and national contexts to evaluate the robustness and generalizability of the proposed framework. Researchers are also encouraged to combine computational discourse analysis with complementary empirical approaches, such as surveys, interviews, longitudinal studies, or mixed-method designs, to directly examine digital human capital development and validate the relationships proposed in the IEDHCF. Such investigations would strengthen the framework's explanatory power, refine its theoretical foundations, and enhance its practical applicability within Human Resource Management and digital economy research.

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References

1. Adekoya, O. D. (2025). Reframing Human Capital: The Strategic Role of Digital Literacy in 21st Century Workforce Development. *Electronic Journal of Business and Management*, 10(3), 15–22. <https://doi.org/10.65136/ejbm.v10i3.18>
2. Ahmad, A., Ghani, N. A., & Hamid, S. (2025). Examining the Predictors of Consumer Trust and Social Commerce Engagement: A Systematic Literature Review. *Journal of Theoretical and Applied Electronic Commerce Research*, 20(3), 247. <https://doi.org/10.3390/jtaer20030247>

3. Ahearne, M., Atefi, Y., Lam, S. K., & Pourmasoudi, M. (2021). The future of buyer–seller interactions: A conceptual framework and research agenda. *Journal of the Academy of Marketing Science*, 50(1), 22–45. <https://doi.org/10.1007/s11747-021-00803-0>
4. Akrou, H., & Woodside, A. G. (2023). Trust Climate in International Business-To-Business E-Negotiations: Antecedents, Processes, and Outcomes. *Journal of Business-to-Business Marketing*, 30(1), 1–13. <https://doi.org/10.1080/1051712x.2023.2172635>
5. Alimova, G. A. (2020). Increasing The Effective Use Of Human Capital In The Digital Economy. *The American Journal of Applied Sciences*, 2(11), 127–130. <https://doi.org/10.37547/tajas/volume02issue11-23>
6. Annisya, A., Prayitno, P. H., & Istiqomah, N. (2023). Digital Era for Entrepreneurs: The Role of Social Media and Business Opportunities (pp. 147–153). Atlantis Press Sarl. https://doi.org/10.2991/978-2-38476-064-0_17
7. Anuj, A., & Professor, P. (2023). Impact of "Social Networking Sites" and "Online Purchase Intention": A Quantitative Investigation. *Psychology and Education*, 55(1). <https://doi.org/10.48047/pne.2018.55.1.85>
8. Billah, M., Saha, D., Bhuiyan, F., & Kaosar, M. (2023). Concept network using network text analysis (pp. 191–208). CRC. <https://doi.org/10.1201/9781003244332-8>
9. Bulina, A., Mozgovaya, K., & Pakhnin, M. (2020). Human capital in economic growth theory: Classical models and new approaches. *St Petersburg University Journal of Economic Studies*, 36(2), 163–188. <https://doi.org/10.21638/spbu05.2020.201>
10. Chatterjee, D., & Dhaigude, A. S. (2024). Browse, Read, Shop, Share: Social Commerce and How to Tap It. *Management Practice Insights*, 2(1), 1–5. <https://doi.org/10.59571/mpi.v2i1.1>
11. Chen, B., & Poquet, O. (2023). Uncovering socio-temporal dynamics in online discussions: An event-based approach. *Australasian Journal of Educational Technology*, 1–16. <https://doi.org/10.14742/ajet.8618>
12. Cheng, P. (2024). Mobile Social Commerce and Its Effects on Consumer Behavior. *Advances in Economics, Management and Political Sciences*, 93(1), 162–170. <https://doi.org/10.54254/2754-1169/93/20241095>
13. Damayanti, A., Miftahuddin, A., Rofaida, R., Perdana, Y., Husna, R. A., & Juliana, J. (2026). Two decades in five years: Mapping digital HR, workflow automation, and innovation ecosystem research (2020–2025). *Daengku: Journal of Humanities and Social Sciences Innovation*, 6(2), 259–275. <https://doi.org/10.35877/454RI.daengku4894>
14. Fernandito, D., Sadiqin, A., & Huseynzadeh, R. (2025). The Impact of Digital Infrastructure Investment on Economic Growth and Social Inclusion in Emerging Economies. *Global Economics: International Journal of Economic, Social and Development Sciences*, 1(3), 01–09. <https://doi.org/10.70062/globaleconomics.v1i3.381>
15. George, Z., & Omari, J. (2025). Assessing the Employment Impacts of Digital Upskilling for Low-Tech Adults: Results from a Pilot Study. RAND Corporation. <https://doi.org/10.7249/rra3912-1>
16. Grugulis, I. (2024). Human capital theory (pp. 93–99). Edward Elgar. <https://doi.org/10.4337/9781035308767.ch10>
17. Hasan Polas, M. R., Samikon, S. A., Mehnaz, F., Kabir, A. I., & Hasan, M. (2024). Restructuring Human Capital Development Through the Adoption of Emerging Transformative Technologies (pp. 353–382). IGI Global. <https://doi.org/10.4018/979-8-3693-5981-5.ch015>
18. Iskandar, I., Juliana, J., Miftahuddin, A., Marlina, L., Ridlwan, A. A., Marlina, R., & Inomjon, Q. (2026). Digital Literacy and Academic Productivity: A Human Capital Perspective in Higher Education. *Human Resources Management and Services*, 8(1). <https://doi.org/10.18282/hrms5793>
19. Johnson, E., Lee, M., & Brooks, R. (2024). This study explores the role of digital literacy in promoting social inclusion within marginalized communities. *International Journal of Humanities and Social Sciences Reviews*, 1(1), 01–03. <https://doi.org/10.62951/ijhs.v1i1.131>
20. Juwitasary, H., Anwar, N., Ismail, M. N., Kurniawan, Y., & Yesmaya, V. (2025). Preliminary Study on Factors Influencing User Engagement in Social Commerce. 256–261. <https://doi.org/10.1109/isci65687.2025.11167618>
21. Kabian, L., Vafaei-Zadeh, A., Hanifah, H., Nikbin, D., & Kooranifar, M. R. (2025). Investigating the determinants of individual's intention to use social commerce: A stimulus-organism-response (S-O-R) approach. *Information Discovery and Delivery*, 1–19. <https://doi.org/10.1108/idd-03-2025-0062>
22. Kamarul Zaman, N.J.F., Ahmi, A., Ismail, S., Abd Samad, K., Juliana, J. (2025), "Gig economy insights: key trends, influencers and research directions". *Global Knowledge, Memory and Communication*, Vol. ahead-of-print No. ahead-of-print. <https://doi.org/10.1108/GKMC-07-2024-0456>
23. Khubulova, V. V., Smagina, M. V., Ivanchenko, I. V., & Marfutenko, T. A. (2022). Development of Human Capital in the Era of Digital Transformation. *European Proceedings of Social & Behavioural Sciences*, 129, 613–622. <https://doi.org/10.15405/epsbs.2022.12.79>
24. Kolmykova, T., & Mishchenko, A. (2021). Digital Competence as a Key Category of a New Quality of Human Capital. *Vestnik Severo-Kavkazskogo Federalnogo Universiteta*, 2, 80–86. <https://doi.org/10.37493/2307-907x.2021.2.10>
25. Korostova, I. (2025). Інклюзивні цифрові екосистеми як пріоритет розвитку людського капіталу сучасності. *Business Navigator*, 6(83). <https://doi.org/10.32782/business-navigator.83-47>
26. Kravchuk, O. (2025). Digital Transformation of Human Capital Management: Enhancing Social Mobility in the Digital Economy. *Journal of Vasyl Stefanyk Precarpathian National University*, 12(2), 80–100. <https://doi.org/10.15330/jpnu.12.2.80-100>
27. Kulakova, S. (2025). Social commerce as a tool of the digital economy: Concepts and characteristics. *Financial and Credit Systems: Prospects for Development*, 1(16), 164–183. <https://doi.org/10.26565/2786-4995-2025-1-13>
28. Kumara, D. (2023). Economic Development of Digital Business Technology in Indonesia. *Interkoneksi: Journal of Computer Science and Digital Business*, 1(1), 30–35. <https://doi.org/10.61166/interkoneksi.v1i1.4>
29. Kuo, Y.-F., & Chen, F.-L. (2020). Social Commerce Research. 1–7. <https://doi.org/10.1145/3429395.3429405>
30. Law Kheen, S., Nazri, M., & Noor, M. (2023). The Mediating Effect of Trust on Consumers' Purchase Decision in Mobile Social Commerce. *Borneo Journal of Social Sciences and Humanities*. <https://doi.org/10.35370/bjssh.2023.5.2-02>

31. Lipp, W., & Mohnen, A. (2024). Communication media in electronic negotiations: How the individual $\times$ medium fit influences negotiation behaviors and outcomes. *Frontiers in Communication*, 9. <https://doi.org/10.3389/fcomm.2024.1402820>
32. Mary Metilda Jayaraj, Subbulakshmi Somu, & Jayavel J. (2026). Technology acceptance and strategic role transformation: Human technology interaction among millennial HR professionals. *Human Resources Management and Services*, 8(1). <https://doi.org/10.18282/hrms5874>
33. Méndez-Domínguez, P., Carbonero Muñoz, D., Raya Díez, E., & Castillo De Mesa, J. (2023). Digital inclusion for social inclusion: Case study on digital literacy. *Frontiers in Communication*, 8. <https://doi.org/10.3389/fcomm.2023.1191995>
34. Menne, F., Hasiara, L. O., Setiawan, A., Palisuri, P., Tenrigau, A. M., Waspada, W., Juliana, J., & Nurhilalia, N. (2024). Sharia accounting model in the perspective of financial innovation. *Journal of Open Innovation: Technology, Market, and Complexity*, 10(1), Article 100176. <https://doi.org/10.1016/j.joitmc.2023.100176>
35. Nawang, W. R. W., Anwar, I. F., Mursidi, A., Najib, N. M., & Mamat, R. A. R. (2025). Shopping on a Social Planet: The Mediating Role of Trust. *Market-Tržište*, 37(1), 9–32. <https://doi.org/10.22598/mt/2025.37.1.9>
36. Noor, R., Rahayu, A., Ratih Hurriyati, Wibowo, L. A., Ramini, N., Miftahuddin, A., Juliana, J., & Ismail, S. (2026). Human Capital Readiness for Cloud–AI–Data Center Ecosystems: A Bibliometric Review. *Human Resources Management and Services*, 8(3). <https://doi.org/10.18282/hrms6018>
37. Patricia Adako, O., & Foyekemi Ekundayo, T. (2025). Bridging the digital divide in education: Strategies for equitable access to technology in low-income communities. *Environment and Social Psychology*, 10(7). <https://doi.org/10.59429/esp.v10i7.3671>
38. Praveer, S. R., Ranganathan, N. K., Arokiasamy, J. W., & Rajendran, P. (2025). Digital frontier as the predictor of buying intention: A recursive model approach. *International Journal of Process Management and Benchmarking*, 21(1), 106–123. <https://doi.org/10.1504/ijpmb.2025.147977>
39. Rajkumar, S. (2024). Building Digital Competencies: HRM's Role in Developing Skills for Innovation and Global Competitiveness. *Educational Administration: Theory and Practice*, 12–22. <https://doi.org/10.53555/kuey.v30i3.10284>
40. Ramakrishnan, K. (2025). Finding Core Topics in XML Text-Based Files Using Latent Dirichlet Allocation. *Rangahau Aranga: AUT Graduate Review*, 4(1). <https://doi.org/10.24135/rangahau-aranga.v4i1.262>
41. Rorlen, R., Ekadjaja, M., & Tjandra Bravo, C. (2025). Assessing Future Purchase Intentions in E-Commerce: An Empirical Study on Digital Consumers. *International Journal of Management Science and Information Technology*, 5(2), 288–294. <https://doi.org/10.35870/ijmsit.v5i2.4736>
42. Rostini, R., Arimbawa, I. G. A. P., Goeliling, A., Vianti, N. N., & A Rahman, F. (2025). Strategy for Human Capital Development in The Entrepreneurial Environment in The Digital Era. *Economics and Business Journal (ECBIS)*, 3(3), 311–318. <https://doi.org/10.47353/ecbis.v3i3.192>
43. Roszko-Wójtowicz, E., Deep Sharma, G., Dańska-Borsiak, B., & Grzelak, M. M. (2025). Social capital as a driver of e-commerce development: Evidence from European panel data analysis. *Equilibrium. Quarterly Journal of Economics and Economic Policy*, 20(2), 681–712. <https://doi.org/10.24136/eq.3781>
44. Roszko-Wójtowicz, E., Pleśniarska, A., & Grzelak, M. M. (2024). Determinants of Digital Economy Development in the EU Member States: The Role of Technological Infrastructure, Human Capital, and Innovation (2017–2022). *Ekonomia i Prawo*, 23(4), 611–635. <https://doi.org/10.12775/eip.2024.31>
45. Rubtsova, N., & Solodukhin, K. (2022). Social Commerce as a Form of Economic Mass Communications. *Theoretical and Practical Issues of Journalism*, 11(1), 114–128. [https://doi.org/10.17150/2308-6203.2022.11\(1\).114-128](https://doi.org/10.17150/2308-6203.2022.11(1).114-128)
46. Sangaji, R. C., Setyaning, A. N. A., & Marsasi, E. G. (2023). A Literature Review on Digital Human Resources Management Towards Digital Skills and Employee Performance (pp. 743–750). Springer. https://doi.org/10.1007/978-3-031-26953-0_68
47. Suhud, U., Allan, M., Hoo, W & Juliana, J. (2025). Purchase intention of Muslim consumers on TikTok live stream: Assessing the role of trust, reliability, and TikTok marketing activities. *International Journal of Data and Network Science*, 9(4), 981–992.
48. Suhud, U., Allan, M., Juliana, J & Rahmi, R. (2024). The drivers of addiction to online shopping, social media, and tourism: A study of cyborg consumers. *International Journal of Data and Network Science*, 8(3), 1405–1414.
49. Suhud, U., Sihotang, D. S., Allan, M., Hoo, W. C., Benk, S., Budak, T., ... Aujirapongpan, S. (2026). Go into Debt for a Vacation: Attitude and Determinant Factors of Tourists to Use the "Pay Later" Payment Method. *International Review of Management and Marketing*, 16(4), 234–241. <https://doi.org/10.32479/irmm.22696>
50. Tanarubun, J. (2021). The Importance of Digital Economic Growth in Indonesia. Center for Open Science. <https://doi.org/10.31219/osf.io/gydm2>
51. Vij, S., & Kaur, B. (2024). Measuring consumer perceptions towards S-commerce: Scale development and validation. *Rajagiri Management Journal*, 19(1), 30–43. <https://doi.org/10.1108/ramj-06-2024-0166>
52. Wang, F. (2025). Digital Transformation and Economic Development: A Comparative Study of Emerging and Developed Economies. *Development Economics of China*, 9(1), 100–104. <https://doi.org/10.47297/wspdecwsp2515-797320.20250901>
53. Wistedt, U. (2024). Consumer purchase intention toward POI-retailers in cross-border e-commerce: An integration of technology acceptance model and commitment-trust theory. *Journal of Retailing and Consumer Services*, 81, 104015. <https://doi.org/10.1016/j.jretconser.2024.104015>
54. Xiao, Y., Huang, K., Yao, Q., Weng, Y., Zhang, Y., Li, T., & Jia, C. (2026). A Social Commerce Marketing Topic Propagation Model Based on Factor Analysis and Stackelberg Game. *IEEE Transactions on Computational Social Systems*, 1–18. <https://doi.org/10.1109/tcss.2026.3653963>
55. Yu Zheng. (2026). Research on digital transformation strategy of human resource management in colleges and universities. *Human Resources Management and Services*, 8(2). <https://doi.org/10.18282/hrms5895>

56. Zhang, T. (2024). Research on Negotiation Skills and Win-Win Strategies in Digital Trade Platforms. *Transactions on Economics, Business and Management Research*, 11, 66–74. <https://doi.org/10.62051/v475bv74>