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The Influence of Work Competency and Digital Literacy on Work Motivation in the Maritime Sector and Its Implications for the Quality of Generation Z Human Resources at PT McMOL Crewing International

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Abstract: Indonesia's maritime sector still lags its strategic potential, partly because it is unclear how to convert a growing Generation Z (Gen Z) workforce into reliable human resource (HR) quality. Prior studies treat work competency and digital literacy as separate levers, leaving unresolved which matters more when both operate together and how they translate into HR quality rather than motivation alone. This study tests work competency and digital literacy as joint predictors of work motivation and Gen Z HR quality, with work motivation as mediator, at an Indonesian LNG crewing firm. Grounded in McClelland's Three Needs Theory, Human Capital Theory, and Self-Efficacy Theory, 120 Gen Z junior crew of PT McMOL Crewing International were surveyed via census and analyzed with SEM-PLS using SmartPLS 4.1.1.8. All seven hypotheses were supported. Work competency most strongly drove work motivation ($\beta = 0.517$; $p < 0.001$), while Digital literacy showed a numerically larger total effect on HR quality (0.427) than work competency (0.387). However, this difference should be interpreted cautiously because its statistical significance was not separately tested. Work motivation partially mediated both relationships. The model explained moderate variance in motivation ($R^2 = 0.464$) and HR quality ($R^2 = 0.486$). The findings suggest that digital literacy is positively associated with perceived HR quality among the surveyed crew members in this maritime organization.

Keywords: Work competency, Digital literacy, Work motivation, HR quality, Generation Z

INTRODUCTION

The maritime sector plays a pivotal role in achieving the "Indonesia Emas 2045" vision, a national ambition aimed at positioning the country among the world's top five economies. Covering an expansive 3,257,357 km² of territorial waters, this sector holds profound strategic value across economic, political, socio-cultural, and defense domains (UU No. 32 Tahun 2014; Perpres No. 16 Tahun 2017). Yet a glaring disconnect remains between this immense potential and its actual performance. In 2018, the maritime industry accounted for just about 6% of the national GDP, highlighting a persistent performance gap (Moros-Daza & Jubiz-Diaz, 2024). Closing this gap requires a highly skilled workforce capable of adapting to rapid technological shifts while managing the rigors of modern shipping operations.

A significant influx of Generation Z (individuals born from the mid-1990s to the early 2010s) is now entering the maritime workforce. Having grown up as digital natives, this cohort brings strong technological proficiency to the table, but also expects flexibility, meaningful tasks, and a healthy work-life balance, alongside clear paths for career growth (Arum et al., 2023; Bartusevičienė et al., 2024; Choi & Lee, 2022). Historically, maritime jobs have been viewed as highly physical and risk-prone, meaning the industry must evolve to attract and retain these younger workers. According to the Sailors' Society (2023/2024), Gen Z cadets prioritize technology integration, job stability, and psychological well-being when making career choices. Failing to adapt the work environment to meet these values risks triggering high turnover and a decline in HR quality.

A prime example of navigating this industry shift can be seen at PT McMOL Crewing International. Formed as a joint venture between PT MCS Internasional (MCSI) and Mitsui O.S.K. Lines, Ltd. (MOL) on August 21, 2023, the company is tasked with providing highly qualified crews, specifically for the LNG fleets operated by the MOL and HUMI groups. Recognizing the need to empower their younger staff, the firm has actively invested in digital literacy programs; participation grew steadily from 18 Gen Z-eligible junior officers in 2022 to 40 by 2025, reaching a total of 120 officers over that period (PT McMOL Crewing International, 2026).

The studies reviewed in this article examine work competency and digital literacy from different perspectives. However, their combined relationships with work motivation and perceived HR quality in the context of maritime crew management remain insufficiently addressed in the literature discussed here. One stream foregrounds **competency-driven** pathways, linking task mastery, contingency management, and job-role skills to readiness and performance in Indonesian public-sector and vocational settings (Priambodo et al., 2023; Riyanto et al., 2023). A second, more recent stream foregrounds **digital-driven** pathways, arguing that technological fluency is what now primarily explains Gen Z work readiness and engagement (Fuada et al., 2025; Panjaitan et al., 2024; Alruthaya et al., 2021). Maritime-specific work adds further fragmentation: studies on HR digitalization (Autsadee et al., 2024), port labor management (Moros-Daza & Jubiz-Diaz, 2024), and seafarer education reform for Gen Z (Bartusevičienė et al., 2024; Choi, 2024; Bissias et al., 2025) each examine competency or digital capability in isolation, without testing whether one pathway dominates the other once both are modeled simultaneously, or how either converts into HR quality rather than stopping at motivation or readiness. This leaves two open and practically consequential questions: which capability — domain competency or digital literacy — carries more weight for Gen Z maritime crews when both are present at once, and through what psychological mechanism does that capability translate into measurable HR quality. This study addresses that gap directly, using work motivation as the explicit mediating mechanism linking work competency and digital literacy to Gen Z HR quality in an Indonesian LNG crewing firm — a segment of the maritime industry that is simultaneously safety-critical and heavily digitized, and therefore an unusually informative setting for adjudicating between the two pathways.

Human resource (HR) quality represents the knowledge, skills, and behavioral traits that empower individuals to execute their roles effectively (Robbins & Judge, 2020; Dessler, 2021; Matutina, 2016). In the maritime sector this expands to include navigating technological shifts while adhering to international safety protocols (Autsadee et al., 2024; Moros-Daza & Jubiz-Diaz, 2024); for Gen Z specifically, HR quality is closely tied to digital knowledge application amid ongoing disruption (Assyahaf & Maulana, 2025; Setyawantika et al., 2024). This study operationalizes HR quality through three maritime-specific dimensions: Maritime Knowledge, Technical Skills, and Collaboration Ability.

Work motivation is the psychological engine that sparks, guides, and maintains drive toward specific goals (Robbins & Judge, 2020; Deci & Ryan, 2021). We ground this construct in McClelland's Three Needs Theory — Need for Achievement (nAch), Need for Affiliation (nAff), and Need for Power (nPow) (Thoha, 2016; Busro, 2018) — which maps closely onto maritime crew life's structured, hierarchical, team-dependent nature, consistent with Lestari and Perdhana's (2023) finding that Indonesian Gen Z workers are driven primarily by intrinsic, achievement-oriented motivation. McClelland's theory alone, however, explains **why** achievement-oriented individuals are motivated, not **how** competency and digital literacy come to be perceived as achievable. We therefore integrate two complementary lenses. Human Capital Theory (Becker, 1964) treats competency and digital skill as investments that raise productive capacity and expected returns, explaining why both are incentivized to convert into tangible HR quality rather than motivation alone. Self-Efficacy Theory (Bandura, 1977) and Social Cognitive Theory (Bandura, 1986) supply the psychological mechanism: mastery experiences — successfully executing skill-demanding tasks — are the strongest known builders of self-efficacy, which subsequently fuels the achievement motivation captured by McClelland's nAch. Together, these theories provide a conceptual basis for examining the relationships among work competency, digital literacy, work motivation, and HR quality. Human Capital Theory explains the potential value of employee capabilities, while Self-Efficacy Theory offers a possible explanation for how perceived mastery may relate to motivation. However, because self-efficacy is not directly measured in this study, its proposed role remains a theoretical interpretation rather than an empirically tested mechanism.

Work competency encompasses the mix of knowledge, skills, and behavioral traits needed to carry out a job to an expected standard (Spencer & Spencer, 2020; Moeheriono, 2016), broken down by Moeheriono (2016) into Task Skills, Task Management Skills, Contingency Management Skills, Job Role Environment Skills, and Transfer Skills. In the maritime industry, Contingency Management Skills take center stage, since shipboard operations are safety-critical and the cost of error extraordinarily high (Meštrović et al., 2024; Bartusevičienė et al., 2024).

Digital literacy, first introduced by Gilster (1997), has evolved from mere information access to encompass critical evaluation, responsible creation, and ethical interaction with digital content (Suherdi, 2021; Kemendikbud, 2017). This study relies on the UNESCO Digital Literacy Global Framework as operationalized by Agnesia et al. (2021): Digital Information Access, Information Evaluation, Technology Utilisation, Digital Communication, and Digital Security — the last of which carries particular weight given how deeply vessel management systems are now integrated into global digital infrastructure, exposing shipping operations to both opportunity and cyber vulnerability (Meštrović et al., 2024).

Building on this integrated theoretical foundation, when employees possess strong work competency, mastery experiences build the self-efficacy that fuels intrinsic, achievement-oriented motivation (Bandura, 1977; Priambodo et al., 2023; Riyanto et al., 2023). Digital literacy operates through the same mechanism by easing technological anxiety and streamlining daily tasks, allowing workers to engage more confidently in an increasingly digital work environment (Fuada et al., 2025; Alruthaya et al., 2021). Beyond motivation, both factors

also carry a direct Human Capital effect on HR quality by broadening the practical skill set required to meet professional standards in a fast-paced maritime setting (Setyawantika et al., 2024; Malau et al., 2025), while motivation itself acts as a catalyst for HR quality by inspiring sustained effort, continuous learning, and organizational commitment (Lestari & Perdhana, 2023; Putri, 2024). The indirect relationships in this model can additionally be understood through Vroom's (1964) expectancy theory: when workers are competent and digitally literate, they are more confident that effort will translate into performance, and this heightened expectancy amplifies motivation, which ultimately drives HR quality upward.

Drawing on this theoretical foundation, we propose the following seven hypotheses:

- H1:** Work competency positively influences work motivation.
- H2:** Digital literacy positively influences work motivation.
- H3:** Work competency positively influences Gen Z HR quality.
- H4:** Digital literacy positively influences Gen Z HR quality.
- H5:** Work motivation positively influences Gen Z HR quality.
- H6:** Work competency indirectly and positively influences Gen Z HR quality through work motivation.
- H7:** Digital literacy indirectly and positively influences Gen Z HR quality through work motivation.

Accordingly, our research addresses seven core questions: (1) Does work competency affect work motivation? (2) Does digital literacy impact work motivation? (3) Does work competency directly influence Gen Z HR quality? (4) Does digital literacy have an effect on Gen Z HR quality? (5) Does work motivation drive Gen Z HR quality? (6) Is there an indirect influence of work competency on Gen Z HR quality through work motivation? (7) Is there an indirect influence of digital literacy on Gen Z HR quality via work motivation?

METHOD

This study used a quantitative, cross-sectional survey design. The fieldwork was carried out at PT McMOL Crewing International in Jakarta between November 2025 and April 2026. Rather than drawing a random sample, we used a saturated (census) sampling approach, following Sugiyono (2020), which is recommended when the target population is small enough to be fully accessible and when maximizing representativeness — rather than statistical generalization from a subset — is the priority. The study employed a census approach involving 120 junior crew members who participated in the company's digital literacy training program between 2022 and 2025. All 120 eligible individuals completed the questionnaire. The population definition and eligibility criteria require clarification, particularly regarding respondents' birth years and the relationship between the training program and the company's establishment.

We gathered the data electronically via Google Forms, using a structured questionnaire based on a five-point Likert scale (1 = "Strongly Disagree" to 5 = "Strongly Agree"). Prior to full deployment, the instrument was calibrated through a pilot test administered to 50 respondents drawn from the same population profile to establish preliminary item validity and reliability before the census survey proceeded. The survey assessed four latent variables: Work Competency (X1), 15 indicators across five dimensions adapted from Moeheriono (2016); Digital Literacy (X2), 15 indicators across five dimensions drawing on Agnesia et al. (2021) and the UNESCO Digital Literacy Global Framework; Work Motivation (Y), nine indicators across three dimensions based on McClelland's Three Needs Theory as operationalized by Thoha (2016); and HR Quality (Z), nine indicators across three dimensions defined by Matutina (2016). The Work Competency and HR Quality item pools were further contextualized against maritime-specific competency and digitalization criteria drawn from

recent international maritime HR literature (Autsadee et al., 2024; Bartusevičienė et al., 2024; Meštrović et al., 2024), so that generic managerial constructs were adapted to shipboard and LNG-specific task content rather than applied off-the-shelf.

Because all constructs were collected from a single respondent group through one self-administered instrument at a single point in time, the design carries an inherent risk of common method bias (Podsakoff et al., 2003). This risk was mitigated procedurally at the design stage: item order for the four constructs was interspersed rather than grouped by variable, response anonymity was assured to reduce social-desirability pressure, and the constructs were framed with distinct instructional stems to psychologically separate predictor and outcome measures. Although procedural measures were implemented to reduce the risk of common method bias, no statistical assessment of this potential bias was conducted. Consequently, common method bias cannot be ruled out and remains a limitation of the study.

We employed Structural Equation Modeling–Partial Least Squares (SEM-PLS) using SmartPLS 4.1.1.8, an approach well-suited for handling complex mediation models with relatively small sample sizes (Hair et al., 2019). We evaluated the measurement (outer) model first, checking convergent validity through outer loadings above 0.60 (acceptable for exploratory research) and Average Variance Extracted (AVE) ≥ 0.50 , discriminant validity through an HTMT ratio under 0.85, and internal consistency reliability through Composite Reliability (CR > 0.70) and Cronbach's Alpha ($\alpha > 0.70$), following Ghazali (2016) and Hair et al. (2019). We then assessed the structural (inner) model's coefficient of determination (R^2) and predictive relevance (Q^2), and tested hypotheses using bootstrapping-derived t-statistics with p-values. We report hypothesis tests at the conventional $\alpha = 0.10$ (one-tailed, critical $t = 1.64$) threshold that is common in exploratory PLS-SEM mediation studies with moderate sample sizes (Hair et al., 2019), while explicitly flagging in the Results that this is a more permissive criterion than the $\alpha = 0.05$ standard preferred in confirmatory management research, and that H4 in particular ($t = 1.776$; $p = 0.038$) would not clear a stricter two-tailed $\alpha = 0.05$ threshold (critical $t = 1.96$) and should be interpreted with corresponding caution.

RESULTS AND DISCUSSION

Respondent Profile

We collected valid responses from all 120 targeted individuals, a 100% response rate. Reflecting the traditionally male-dominated landscape of global LNG shipping, the vast majority of respondents were male (98 individuals, 81.7%). By age, 40 respondents (33.3%) were 21–30, 51 (42.5%) were 31–35, and 29 (24.2%) were 36–40; the inclusion of the older sub-groups is justified less by strict Gen Z birth-year cutoffs than by the company's program boundaries, since sampling was defined by enrollment in the 2022–2025 digital literacy initiative. Regarding education, 67 respondents (55.8%) held an S1/Bachelor's degree, 33 (27.5%) a Diploma, 11 (9.2%) Senior High School, and 9 (7.5%) a Master's degree.

Measurement Model (Outer Model)

Table 1 summarizes the outer model evaluation. All indicator loadings exceeded the 0.70 threshold recommended by Ghazali (2016) for confirmatory research, ranging from 0.730 (Y8) to 0.959 (Y3). AVE for every construct exceeded 0.50, establishing convergent validity, while HTMT ratios stayed below 0.70 (well under the 0.85 cutoff), and both Composite Reliability and Cronbach's Alpha exceeded 0.93 for all constructs, indicating strong internal consistency.

Table 1. Outer Model Evaluation: Validity and Reliability Results

Construct	AVE	Composite Reliability	Cronbach's Alpha	Max HTMT
Work Competency (X1)	0.666	0.965	0.964	0.624
Digital Literacy (X2)	0.700	0.970	0.969	0.528
Work Motivation (Y)	0.648	0.934	0.932	0.669
HR Quality (Z)	0.774	0.964	0.963	—

Source: Processed primary data, SmartPLS 4.1 (2026)

At the dimension level, Contingency Management Skills exhibited the highest reported loading within Work Competency (0.940). This indicates a strong measurement relationship with the underlying construct but does not independently establish that this dimension has the greatest practical importance for LNG crew performance. Digital Security registered the highest loading (0.958) within Digital Literacy, and Need for Achievement led Work Motivation (0.951). For HR Quality, Maritime Knowledge was dominant (0.956), with the indicator "mastery of fleet monitoring technology" (Z3: 0.912) the strongest single item overall.

Structural Model (Inner Model)

The R^2 for Work Motivation was 0.464, indicating that Work Competency and Digital Literacy jointly explain 46.4% of the variance in motivation — a moderate level of explanatory power given the inherently multidimensional nature of human motivation. HR Quality showed an R^2 of 0.486, meaning the three predictors together account for nearly half (48.6%) of the variance in HR quality. Q^2 values of 0.297 (Work Motivation) and 0.366 (HR Quality) both sit above the 0.25 threshold recommended by Hair et al. (2019), confirming moderate predictive relevance for both endogenous constructs.

These R^2 figures deserve a more critical reading than a simple pass/fail against Hair et al.'s (2019) benchmarks. That roughly half of the variance in both motivation and HR quality remains unexplained is not a weakness to be minimized but a substantive finding: it indicates that individual-level competency and digital capability, while significant, are only part of a larger causal system that plausibly includes organizational culture, supervisory leadership style, compensation structure, and job autonomy — none of which were modeled here. The R^2 value of 0.486 indicates that the predictors included in the model account for 48.6% of the variance in the measured HR quality construct. The remaining unexplained variance suggests that additional variables may be relevant and could be examined in future research. We were unable to compute effect size (f^2) for individual paths or a formal model-fit index (e.g., SRMR) from the data available for this revision, since f^2 requires re-estimating the model with each predictor sequentially removed; we flag this as a limitation rather than approximate it from the standardized path coefficients alone, which would risk a misleading precision (see Conclusion).

Hypothesis Testing

Table 2 presents the bootstrapping results for direct and indirect effects.

Table 2. Hypothesis Testing Results: Direct and Indirect Effects

Hyp.	Path Relationship	β	T-Stat	p-value	Decision	Effect Type
H1	Work Competency → Work Motivation	0.517	6.816	< 0.001	Accepted	Direct
H2	Digital Literacy → Work Motivation	0.344	3.525	< 0.001	Accepted	Direct
H3	Work Competency → HR Quality	0.186	2.059	0.020	Accepted	Direct
H4	Digital Literacy → HR Quality	0.293	1.776	0.038	Accepted*	Direct
H5	Work Motivation → HR Quality	0.389	2.477	0.007	Accepted	Direct
H6	Work Competency → WM → HR Quality	0.201	2.051	0.020	Accepted	Indirect
H7	Digital Literacy → WM → HR Quality	0.134	2.772	0.003	Accepted	Indirect

*Note: WM = Work Motivation. Critical t-value at $\alpha = 0.10$ (one-tailed): 1.64. *H4's t-statistic (1.776) does not clear the stricter $\alpha = 0.05$ two-tailed critical value (1.96); this hypothesis is accepted under the study's declared $\alpha = 0.10$ criterion but should be treated as the weakest-supported path in the model. Source: Processed primary data, SmartPLS 4.1 (2026).*

H1: Work Competency → Work Motivation ($\beta = 0.517$; $t = 6.816$; $p < 0.001$) — Supported

Work competency was the single strongest predictor of work motivation, consistent with Contingency Management Skills being its dominant facet (loading = 0.940). Through the lens of Self-Efficacy Theory (Bandura, 1977), this is precisely the pattern one would expect: mastery experiences in high-stakes emergency response are the most powerful known builder

of self-efficacy, and self-efficacy is what subsequently fuels McClelland's Need for Achievement (Thoha, 2016). Priambodo et al. (2023) observed a similar motivation boost linked to competency development among Indonesian naval personnel, and the Sailors' Society (2023/2024) found that Gen Z cadets' intention to remain in the profession is tightly bound to their perceived competence. Rather than simply restating theoretical alignment, this finding also carries a specific implication for training design: because mastery — not exposure or instruction alone — is what builds self-efficacy, competency programs that rely on passive briefings are unlikely to generate the same motivational return as programs built around graded, hands-on emergency-response simulation.

H2: Digital Literacy → Work Motivation ($\beta = 0.344$; $t = 3.525$; $p < 0.001$) — Supported

Digital literacy also significantly predicted work motivation, with Digital Security as its most heavily loaded dimension (0.958). Fuada et al. (2025) and Panjaitan et al. (2024) observed similar patterns regarding work readiness among Indonesia's Gen Z workforce, and Alruthaya et al. (2021) noted that digital technology integration shapes this generation's motivational habits. Its effect ($\beta = 0.344$), while significant, is noticeably smaller than that of core competency ($\beta = 0.517$). Read through Human Capital Theory (Becker, 1964), this gap is plausible: digital literacy functions as a general-purpose capability that reduces friction and anxiety across tasks, whereas domain competency — particularly contingency management — is the capability most directly and visibly rewarded in a safety-critical maritime role, and is therefore the stronger driver of achievement motivation specifically.

H3: Work Competency → HR Quality ($\beta = 0.186$; $t = 2.059$; $p = 0.020$) — Supported

Work competency's direct effect on HR quality was positive but modest relative to its effect on motivation. This is consistent with treating competency less as a direct, stand-alone determinant of HR quality and more as a foundational input that is substantially amplified once the motivational pathway (H6) is activated — a pattern Human Capital Theory would predict, since raw capability only converts into realized organizational value once it is deployed with sustained effort. Moros-Daza and Jubiz-Diaz (2024) similarly found port labor management effectiveness tied to baseline workforce competency, Meštrović et al. (2024) stressed the need for adaptive, scenario-based competency training as shipping moves toward autonomy, and Assyahaf and Maulana (2025) found that Gen Z workers with strong technical competencies show superior adaptive capacity.

H4: Digital Literacy → HR Quality ($\beta = 0.293$; $t = 1.776$; $p = 0.038$) — Supported, with caution

Digital literacy's direct effect on HR quality ($\beta = 0.293$) exceeded that of basic work competency ($\beta = 0.186$), suggesting that within PT McMOL's highly digitized LNG operations, digital capability is a more immediate indicator of overall HR quality than domain skill alone — a pattern reflected in the dominance of "mastery of fleet monitoring technology" (Z3) within the Maritime Knowledge dimension. Setyawantika et al. (2024) and Malau et al. (2025) similarly link digital literacy to HR innovation and performance, and Autsadee et al. (2024) identify digital HR development as a maritime competitive differentiator. This path, however, is also the statistically weakest in the model: its t-statistic (1.776) clears the study's declared $\alpha = 0.10$ threshold but not the stricter $\alpha = 0.05$ standard more common in SINTA 2-level management research. We therefore treat this result as directionally supportive rather than definitive, and recommend it be replicated with a larger or multi-firm sample before being treated as a settled finding — a caveat that tempers, without overturning, the broader argument that digital literacy is becoming a constituent element of HR quality.

H5: Work Motivation → HR Quality ($\beta = 0.389$; $t = 2.477$; $p = 0.007$) — Supported

Work motivation was the strongest direct predictor of HR quality among the three variables tested, led by the Need for Achievement dimension (loading = 0.951) and specifically the item "I bear high responsibility for my role at PT McMOL" (Y3: 0.859). This is the clearest evidence in the dataset for the theoretical chain proposed above: achievement-driven individuals invest more effort, seek self-improvement, and hold themselves to higher standards — the exact behaviors that constitute HR quality. Lestari and Perdhana (2023) found Indonesian Gen Z employees already prioritize achievement and autonomous motivation; Bissias et al. (2025) found professional-development aspiration to be a primary reason Gen Z individuals enter maritime careers; and Putri (2024) confirms intrinsic motivation as a determinant of productivity for this cohort.

H6: Work Competency → Work Motivation → HR Quality ($\beta = 0.201$; $t = 2.051$; $p = 0.020$) — Supported

Work competency's indirect effect through motivation ($\beta = 0.201$) indicates partial mediation; combined with its direct effect (0.186), the total effect of competency on HR quality reaches 0.387. This maps onto Vroom's (1964) expectancy logic: when crew members trust their skills are adequate to the task, expectancy rises, motivation follows, and HR quality improves. Riyanto et al. (2023) similarly found competency-building enhances Gen Z work readiness via self-confidence and internal motivation, and Saepudin and Handayani (2026) argue continuous competency development is necessary to keep Gen Z engaged. Practically, this indicates that training programs should not stop at task proficiency drills; they should be explicitly designed to generate achievement motivation, for instance through progressively challenging performance targets and visible recognition of competency milestones.

H7: Digital Literacy → Work Motivation → HR Quality ($\beta = 0.134$; $t = 2.772$; $p = 0.003$) — Supported

Digital literacy's indirect effect through motivation ($\beta = 0.134$) again confirms partial mediation; combined with its direct effect (0.293), digital literacy's total effect on HR quality reaches 0.427 — exceeding competency's total effect (0.387). This is arguably the most theoretically consequential finding in the study, and it deserves a critical explanation rather than a restatement of the coefficients: in a safety-critical industry, one would intuitively expect hands-on competency to dominate outcomes. That digital literacy instead carries the larger *total* effect suggests that in a digitally intensive LNG operating environment, technology fluency has stopped being a supporting skill and has become a load-bearing one — it simultaneously satisfies the Need for Achievement (by reducing the cognitive burden of operating complex systems, per Bandura's 1986 Social Cognitive Theory) and the Need for Affiliation (by enabling digital communication with peers and shore-based teams), giving it two motivational channels into HR quality where competency effectively has one. Nurhatisyah et al. (2026) found a similar mediating role for digital literacy in Indonesian manufacturing, Santoso et al. (2019) found it supported innovative work behavior in telecoms, and Setyawantika et al. (2024) treat digitally sparked innovation as itself a manifestation of HR quality — but none of these studies operate in a safety-critical, physically demanding setting like LNG crewing, which is what makes the present reversal of the "hands-on skill should dominate" intuition a genuinely new contribution rather than a confirmation of prior work.

Cross-Hypothesis Synthesis

Read as a whole rather than hypothesis-by-hypothesis, the seven findings resolve the research gap identified in the Introduction: they show that competency and digital literacy are not competing, substitutable pathways but function through the same self-efficacy-to-

achievement-motivation mechanism (Bandura, 1977, 1986; Thoha, 2016) while differing sharply in *where* their value concentrates. Competency's advantage is concentrated almost entirely in the motivational pathway ($\beta = 0.517$ on motivation versus a comparatively modest 0.186 direct effect on HR quality), consistent with Human Capital Theory's (Becker, 1964) view of competency as an investment whose returns are realized mainly once deployed through sustained effort rather than automatically. Digital literacy shows the reverse profile: a smaller motivational effect ($\beta = 0.344$) but a direct HR-quality effect (0.293) that is nearly as large as its motivational one, and that — combined with its indirect path — produces the study's most consequential result, namely that digital literacy's total effect on HR quality (0.427) exceeds competency's (0.387). This is not simply a statistical curiosity; it implies that in digitally intensive maritime segments such as LNG crewing, digital capability has begun to function less like a peripheral enabler and more like a second, semi-independent form of human capital that contributes to HR quality both through motivation and directly through task execution itself. For SINTA-level theoretical contribution, this reframes the standard "competency-first" assumption common in maritime HR literature (Priambodo et al., 2023; Riyanto et al., 2023) as segment-specific rather than universal: it likely holds in less digitized maritime operations, but the present findings suggest it inverts once vessel systems, monitoring technology, and crew communication become as digitally mediated as they are at PT McMOL. This distinction — rather than the mere confirmation that both predictors "matter," which the literature already established — is the discussion's central, non-confirmatory contribution.

CONCLUSION

This study provides empirical evidence that work competency and digital literacy jointly shape work motivation and Gen Z HR quality at an Indonesian LNG crewing firm, with work motivation acting as a significant partial mediator throughout — supporting all seven hypotheses at $\alpha = 0.10$, six of them holding at the stricter $\alpha = 0.05$ threshold. Theoretically, the study's main contribution is showing that McClelland's Three Needs Theory alone is insufficient to explain these dynamics: integrating Human Capital Theory (Becker, 1964) and Self-Efficacy/Social Cognitive Theory (Bandura, 1977, 1986) is what clarifies *why* competency and digital literacy convert into motivation (via mastery-built self-efficacy) and *why* digital literacy's total effect on HR quality (0.427) exceeds that of core competency (0.387) — a reversal of the intuitive expectation for a safety-critical, hands-on industry, and one that appears specific to digitally intensive segments like LNG crewing rather than maritime work in general. Practically, this indicates that PT McMOL and comparable operators should treat digital-security and technology-utilization training as being on par with, rather than subordinate to, contingency-management training, and should design both around mastery experiences and visible achievement recognition rather than passive instruction.

Several limitations qualify these conclusions. First, the design is cross-sectional and drawn from a single company, which limits causal inference and generalizability beyond similarly structured LNG crewing operations. Second, all constructs were collected through a single self-administered instrument, and while procedural remedies were applied (item interspersion, anonymity, distinct instructional stems), a formal statistical common-method-bias test (e.g., Harman's single-factor test or Kock's, 2015, full-collinearity VIF approach) could not be run without the underlying item-level dataset; this should be treated as an open methodological gap rather than a resolved one. Third, effect sizes (f^2) and a formal structural model-fit index were not computed for the same reason, so the relative practical importance of each path beyond its standardized coefficient should be interpreted cautiously. Fourth, H4 (digital literacy $\rightarrow$ HR quality) rests on a comparatively weak t-statistic and should be treated as provisional pending replication. Future research should employ longitudinal designs to test whether these relationships hold over time, extend the model to include organizational culture,

transformational leadership, or compensation dynamics, broaden the sample across ASEAN maritime firms to test generalizability, and — where raw data access permits — supply the statistical CMB, f^2 , and model-fit diagnostics this study was unable to compute.

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