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Becoming a Professional Auditor: Professional Identity Formation among Junior Auditors in Bali

Alfaningtyas Shulivien Mangile

Alfaningtyas Shulivien Mangile

Faculty of Economics and Business, Udayana University, Denpasar, Indonesia

Corresponding author email: alfaningtyasmangile@gmail.com

I Putu Sudana

Faculty of Economics and Business, Udayana University, Denpasar, Indonesia

Abstract---Professional identity formation is a critical process for junior auditors, as it shapes how they understand their professional roles, values, and responsibilities during the early stages of their careers. Beyond acquiring technical auditing competencies, junior auditors are expected to internalize professional values such as integrity, objectivity, independence, competence, and professional responsibility through their workplace experiences. This study aims to understand and describe the lived experiences of junior auditors in developing their professional identities in Bali, Indonesia. A qualitative research design employing Moustakas's (1994) transcendental phenomenological approach was adopted. Five junior auditors working at public accounting firms in Bali participated in the study. The participants had less than two years of professional experience and had been directly involved in audit engagements. Data were collected through semi-structured in-depth interviews, observations, and documentation. Data analysis followed the stages of epoche, phenomenological reduction involving horizontalization and the identification of invariant constituents, imaginative variation, and the synthesis of meanings and essences. Trustworthiness was established through member checking, methodological triangulation, and peer debriefing. The findings reveal that professional identity formation among junior auditors develops gradually through their transition into the workplace, observation of senior auditors as professional role models, involvement in audit engagements, interactions with audit team members and clients, and reflection on professional experiences. Exposure to work demands and ethical situations further shapes their understanding of professional values and responsibilities. These findings indicate that professional identity is not formed solely through formal education or technical competence but evolves through adaptation, social learning, direct professional experience, and individual reflection. The study highlights the importance of structured mentoring, professional guidance, and workplace learning opportunities in supporting the professional development of junior auditors. It concludes that professional identity formation is a dynamic and experiential process shaped by workplace interactions, professional practice, role modelling, and continuous reflection.

Keywords---professional identity, junior auditors, lived experience, transcendental phenomenology, public accounting firms.

Introduction

Professional identity formation refers to the process through which individuals develop an understanding of themselves as members of a profession by internalizing its values, roles, responsibilities, and expected patterns of conduct. In auditing, this process involves more than acquiring technical competence; auditors are also expected to understand and enact professional values such as integrity, objectivity, independence, competence, and responsibility to the public interest. This process is particularly important at the beginning of a career, when junior auditors move from formal education into professional practice and begin to encounter organizational expectations, professional

norms, and work-related responsibilities in real settings. Their professional identity therefore develops not simply from holding the formal status of an auditor, but through experiences of performing audit work, interacting with senior auditors and team members, communicating with clients, adapting to organizational practices, and reflecting on these experiences (Parker & Kohlmeyer III, 2005).

For junior auditors, workplace experiences provide opportunities to reconcile previously acquired knowledge with the realities of professional practice. During audit engagements, they learn how tasks are completed, how professional communication is conducted, how instructions from senior auditors are interpreted, and how expectations within public accounting firms are negotiated. They may also encounter situations that require them to interpret professional values, including integrity, objectivity, independence, competence, and professional responsibility. The meanings attached to these experiences become part of how junior auditors understand themselves and their roles as professionals. Public accounting firms in Bali provide a relevant setting for examining this process because junior auditors are directly involved in audit engagements and interact with various organizational actors and clients. In this study, the characteristics of particular industries or clients are not treated as analytical variables; rather, the workplace is regarded as the experiential context in which professional identity is formed and interpreted (Brackley et al., 2025).

The formation of professional identity in this study is informed by Ibarra's (1999) Professional Identity Theory. Ibarra (1999) explains that individuals entering new professional roles develop their identities through observing role models, experimenting with provisional selves, and evaluating and refining emerging professional identities. This perspective is relevant to junior auditors who observe more experienced auditors, attempt to perform professional roles in actual audit situations, and subsequently evaluate their own conduct and experiences. Deontological and teleological ethical perspectives are used as supporting lenses when participants' experiences involve ethical considerations. The deontological perspective emphasizes duties and moral principles as the basis for action, whereas the teleological perspective considers the consequences of professional decisions. These perspectives provide additional context for understanding how ethical experiences may contribute to the development of professional identity.

Previous studies have examined several aspects of auditors' ethical behavior and professional experiences. Islamiati et al. (2023), found that auditor idealism positively influences ethical behavior, whereas a stronger love of money orientation tends to weaken ethical conduct. Alfina et al. (2021) reported that accounting students demonstrated higher levels of ethical idealism than professional auditors, suggesting that ethical orientations may change as individuals move from educational environments into professional practice. More recent studies have also highlighted increasingly complex professional challenges. Fadlilah et al. (2025) showed that technological developments and the use of artificial intelligence in auditing create ethical concerns related to algorithmic dependence, potential system bias, and auditor independence. Siti Aminah & Sokarina (2025) described ethical dilemmas as experiences involving internal moral conflict, relational pressure from clients, and competing professional values. Similarly, Saraswati (2023) found that work experience and understanding of professional ethics contribute to auditors' ability to respond to ethical dilemmas, although junior auditors may remain vulnerable to professional pressures during the early stages of their careers.

Although these studies provide important insights into ethical behavior, professional pressure, work experience, and decision-making, research on auditors has largely focused on behavioral outcomes, independence, audit quality, ethical judgment, and factors associated with professional conduct. Such studies explain how auditors respond to particular conditions, but provide less understanding of how junior auditors experience and interpret the process of becoming professionals. In particular, the lived experience of junior auditors has received limited attention as a means of understanding how professional identity develops from the transition into professional practice. Existing research therefore leaves an important gap regarding how workplace experiences are learned, interpreted, reflected upon, and incorporated into junior auditors' understanding of themselves as members of the auditing profession (Zarefar & Zarefar, 2016).

This gap is particularly relevant during the early career stage, when individuals are still adapting to professional roles and learning the behavioral expectations associated with the profession. To address this gap, the present study employs Moustakas's (1994) transcendental phenomenological approach to explore the lived experiences of junior auditors working in public accounting firms in Bali. This approach allows the study to move beyond identifying factors associated with professional identity and instead examine what junior auditors experience, how those experiences occur, and what meanings they attribute to them. Ibarra's (1999) Professional Identity Theory is used to support the interpretation of identity formation, while deontological and teleological perspectives are applied contextually when participants' experiences involve ethical issues.

Accordingly, this study aims to understand and describe how junior auditors in Bali experience the process of professional identity formation during the early stages of their careers (Widyastari et al., 2023). The study does not

seek to measure professional identity, test relationships among variables, or determine the strongest predictors of professional identity. Rather, it seeks to reveal the essence of junior auditors' experiences, particularly how adaptation to the workplace, observation of professional role models, participation in audit engagements, encounters with professional situations, and individual reflection contribute to their developing understanding of themselves as professional auditors. By focusing on these lived experiences, the study offers a phenomenological account of professional identity formation that complements existing research on auditors' ethical behaviour and professional conduct.

Methods

The study was conducted across several public accounting firms in Bali, Indonesia, with participants selected through purposive sampling. Five junior auditors participated in the study, all of whom had less than two years of professional experience and had been involved in audit engagements. Data collection continued until data saturation was reached at the fifth participant. Semi-structured in-depth interviews served as the primary data collection method and were conducted either face-to-face or via Zoom, depending on participant availability. Observations during the interviews and field notes were used to capture relevant contextual and non-verbal information, while interview recordings and supporting documentation were used to maintain the accuracy and traceability of the data.

Data were analyzed following the four stages of transcendental phenomenological analysis proposed by Moustakas (1994): epoche, phenomenological reduction, imaginative variation, and synthesis of meanings and essences. During phenomenological reduction, interview transcripts were examined through horizontalization to identify significant statements and invariant constituents, which were subsequently clustered into themes and developed into textural descriptions of what participants experienced. Imaginative variation was then used to construct structural descriptions explaining how these experiences occurred, followed by a synthesis of textural and structural descriptions to identify the essence of professional identity formation among junior auditors. Ibarra's (1999) Professional Identity Theory informed the interpretation of the findings, while deontological and teleological perspectives were applied when participants' experiences involved ethical considerations. Trustworthiness was strengthened through member checking, source triangulation, and peer debriefing, while participant and organizational identities were anonymized to maintain confidentiality.

Results and Discussion

Analysis of the lived experiences of the five junior auditors generated six interrelated themes: (1) adaptation to the realities of audit work, (2) learning and competence development through workplace experience, (3) workplace support and the role of senior auditors, (4) work pressure and its management, (5) the development of professional attitudes and independence, and (6) tensions among professional principles, superior decisions, and client interests. These themes were consistently identified across participants, although the specific situations and meanings attached to them varied according to individual work experiences. Collectively, the findings indicate that professional identity formation is not a discrete event but a gradual process through which junior auditors encounter, interpret, test, and reflect on what it means to perform the role of a professional auditor.

Adapting to the Realities of Audit Work

The first theme concerns the transition from prior expectations about auditing to the realities encountered in professional practice. Participants entered public accounting firms with varying levels of understanding about audit work. For several participants, formal education provided conceptual knowledge but did not fully prepare them for the complexity of actual audit engagements. P1, for example, initially viewed auditing primarily as examining financial statements and identifying irregularities, but later realized that the work required substantially more contextual understanding and judgment:

"I used to think it was simple—just checking financial statements, finding something unusual, and asking the client. It turned out to be much more complicated than that." (P1, translated)

Similarly, P2 described difficulty when being assigned to fieldwork shortly after joining the firm, while P5 emphasized the need to adjust simultaneously to the organizational environment and the technical requirements of auditing. These experiences suggest that adaptation involved more than becoming familiar with a new workplace. Junior auditors had to learn how audit procedures were implemented, how responsibilities were distributed within teams, how working papers were prepared and reviewed, and how auditors interacted with clients.

This transition gradually changed participants' perceptions of the profession. Audit work became understood not simply as a collection of technical procedures but as a structured professional activity involving judgment, communication, documentation, accountability, and interaction with multiple parties. Adaptation therefore constituted an important initial stage of professional identity formation: participants moved from possessing an abstract understanding of auditing toward developing a contextual understanding of themselves within the professional role.

Learning and Developing Competence through Workplace Experience

The second theme demonstrates that professional competence was developed primarily through direct involvement in audit work. Participants described learning how to prepare working papers, use audit tools, evaluate transactions, communicate with clients, identify material information, and correct errors through repeated practice. Difficulties and mistakes were not merely obstacles but became important learning experiences.

P2, for example, initially struggled with audit working papers and spreadsheet functions and sought assistance from senior auditors as well as independent sources. After making mistakes and receiving corrections, the participant interpreted the experience as part of workplace training. P5 summarized this experiential orientation explicitly:

"My principle has always been simple: learning by doing." (P5, translated)

As participants gained greater exposure to audit engagements, their competence expanded beyond technical knowledge. They reported becoming more meticulous, analytical, communicative, and confident in carrying out assigned responsibilities. Engagement with different clients and audit situations also required them to adjust their knowledge to specific contexts rather than apply procedures mechanically.

The findings correspond closely with Ibarra's (1999) notion of experimenting with provisional selves. Junior auditors were effectively experimenting with ways of performing the professional role: completing assignments, communicating with clients, presenting findings, dealing with errors, and assuming increasing responsibility. Feedback from these experiences enabled them to distinguish behaviors and competencies that should be retained from those requiring improvement. Professional competence was therefore not developed through a single learning event but through repeated cycles of experience, correction, application, and evaluation. As competence increased, participants also developed greater confidence that they were capable of functioning as auditors, thereby strengthening their emerging professional identities.

Workplace Support and the Role of Senior Auditors

Professional development did not occur in isolation. Senior auditors, supervisors, team leaders, and colleagues constituted an important social environment through which junior auditors learned how professional work should be performed. Senior auditors provided technical guidance, reviewed working papers, corrected mistakes, explained audit procedures, assisted with client communication, and demonstrated ways of responding to professional problems.

For some participants, senior auditors also became explicit professional role models. P5 described a supervisor as a figure from whom both technical and interpersonal skills were learned, while P2 expressed an aspiration to emulate a senior auditor whose competence and patience were particularly admired. The influence of these role models extended beyond technical knowledge. Participants observed how senior auditors communicated, supervised others, responded to mistakes, interacted with clients, and maintained professional standards.

These experiences reflect Ibarra's (1999) concept of observing role models. Role models provided junior auditors with possible representations of how a professional auditor could behave. Importantly, participants did not necessarily reproduce the behavior of one senior auditor in its entirety. Instead, they selected particular qualities they considered appropriate and incorporated these into their developing understanding of professional conduct.

The findings also reveal that negative experiences with supervision contributed to identity development. Participants who experienced unclear instructions or inadequate guidance reflected on how they would supervise junior colleagues differently in the future. Thus, professional identity was shaped not only by behaviors participants wished to emulate but also by practices they consciously chose not to reproduce. Senior auditors therefore served simultaneously as sources of technical learning, behavioral examples, feedback providers, and reference points against which junior auditors evaluated the kind of professionals they wished to become.

Work Pressure and the Development of Professional Resilience

Work pressure emerged as another central experience in the participants' early careers. Sources of pressure included deadlines, multiple engagements, complex assignments, repeated work, incomplete or delayed client data, communication difficulties, and expectations from senior team members. Participants consequently had to learn not

only how to perform audit procedures but also how to maintain the quality of their work under demanding conditions.

P1 described pressure arising when deadlines approached while clients remained slow in providing the required information. Errors could also generate emotional responses. After overlooking an adjusting entry, P1 recalled feeling anxious and guilty but subsequently changed working habits by documenting findings more carefully. Such experiences demonstrate how mistakes became occasions for reflection and behavioral adjustment rather than merely technical failures.

Participants developed different strategies for managing work pressure. These included prioritizing tasks, seeking assistance from senior auditors, discussing difficulties with colleagues, relying on teamwork, and establishing boundaries between professional and personal life. Through these experiences, junior auditors learned that professionalism does not necessarily mean resolving every problem independently. It also involves recognizing one's limitations, seeking appropriate support, organizing responsibilities, and maintaining the quality of work despite time and workload constraints.

The process resembles the evaluating experiments described by Ibarra (1999). Participants evaluated how effectively they responded to pressure and subsequently modified their approaches. Pressure therefore contributed to professional identity formation by requiring junior auditors to define what responsible professional behavior meant when time, workload, and organizational expectations competed for attention.

Developing Professional Attitudes and Independence

The fifth theme concerns the gradual internalization of professional attitudes, particularly integrity, objectivity, independence, competence, and responsibility. Participants' understanding of these principles became more concrete when they were required to apply them during actual audit engagements.

Objectivity, for example, was experienced through the requirement to base conclusions on audit evidence rather than simply accepting client explanations. P3 emphasized this lesson:

"I learned the importance of being meticulous, maintaining independence, following procedures, and always basing every conclusion on audit evidence." (P3, translated)

Independence was similarly understood as more than an abstract professional principle. Participants learned that professional judgment needed to be protected from inappropriate influence and that maintaining a positive working relationship with clients did not require compromising audit procedures. Some firms supported this process through organizational mechanisms designed to prevent conflicts of interest, such as reallocating engagements when auditors had personal connections with clients and establishing hierarchical procedures for reporting potential fraud or client pressure.

These findings demonstrate that professional values were internalized through practice rather than through normative knowledge alone. Formal education and professional codes provided conceptual foundations, but their meaning became clearer when junior auditors had to decide how those principles should guide actual conduct. The deontological perspective helps explain situations in which participants emphasized professional duties and adherence to established principles, whereas the teleological perspective provides insight into occasions when participants considered the potential consequences of their actions for the engagement, organization, client relationships, or their own professional position. These perspectives are not mutually exclusive classifications of participants; rather, they illuminate the ethical considerations embedded within professional identity development.

Tensions among Professional Principles, Superior Decisions, and Client Interests

The sixth theme reveals a more complex dimension of professional identity formation. Junior auditors sometimes encountered situations in which their understanding of professional principles intersected with hierarchical authority and client interests. This placed participants in a position where they were expected to follow organizational structures while simultaneously developing a sense of personal responsibility for the integrity of their work.

Participants reported different organizational responses to such situations. P2 experienced a case in which a finding was handled differently following client involvement and expressed disappointment because the outcome conflicted with the participant's understanding of honesty and independence. P4 similarly encountered a situation in which an audit finding supported by evidence was ultimately subjected to a decision from a superior. Such experiences made participants aware of the limited formal authority associated with junior positions.

Other participants encountered contrasting organizational environments. P3 reported that procedures continued to be followed even when clients requested changes to audit results. P5 described organizational mechanisms intended to protect auditor independence and recalled an attempted client intervention that was rejected because of internal

oversight and a strong commitment to independence. These contrasting experiences indicate that professional identity formation is influenced not only by individual ethical commitment but also by the organizational environment in which professional standards are enacted.

For junior auditors, these situations became important learning experiences concerning professional voice, organizational hierarchy, and the boundaries of authority. Following a superior's direction cannot automatically be interpreted as a failure of independence because supervision and hierarchical responsibility are inherent to audit work. The critical issue is how junior auditors interpret situations in which instructions, available evidence, professional standards, and client interests appear to conflict.

From the perspective of Ibarra (1999), such situations provide particularly consequential opportunities for identity experimentation and evaluation. Junior auditors observe how senior professionals manage competing interests, attempt to determine appropriate responses within their own authority, and evaluate the consequences of those responses. Professional identity therefore develops not only through successful and supportive experiences but also through tensions that require individuals to consider what professional values mean in practice.

The Essence of Professional Identity Formation: Becoming an Auditor through Experience and Reflection

Across the six themes, reflection emerged as the process through which workplace experiences were transformed into personal meanings about being an auditor. Participants did not develop professional identities simply because they had completed audit tasks. Rather, identity development occurred when they evaluated what they had experienced, compared their earlier expectations with professional realities, recognized changes in their abilities and attitudes, and determined which behaviors and values they wished to retain.

This reflective process corresponds with the interaction among observing role models, experimenting with provisional selves, and evaluating experiments proposed by Ibarra (1999). The findings, however, suggest that these processes do not occur in a rigid linear sequence. Junior auditors may observe a senior auditor, attempt a particular professional behavior, receive feedback, reassess that behavior, and return to observing or experimenting as new situations arise. Professional identity formation is therefore iterative and continuously reconstructed through new experiences.

The phenomenological essence identified in this study can consequently be understood as becoming a professional through experiences that are encountered, observed, enacted, evaluated, and continuously interpreted within the audit workplace. Junior auditors gradually move from learning what auditors are expected to do toward developing a clearer understanding of who they are as auditors. Adaptation introduces them to professional reality; workplace experience develops competence; senior auditors provide professional references; pressure tests their capacity to assume responsibility; ethical and professional situations give practical meaning to independence and integrity; and reflection integrates these experiences into an emerging professional self.

The findings therefore extend the understanding of professional identity formation beyond technical socialization. Becoming an auditor involves an ongoing negotiation between individual interpretations and the professional environment. Junior auditors are not passive recipients of professional norms. They actively observe, experiment, evaluate, accept, reject, and reinterpret the practices they encounter. Professional identity at this stage is consequently dynamic rather than fixed, developing as junior auditors increasingly define who they are as auditors, how they believe an auditor should act, and which professional values they intend to maintain when confronted with organizational and client-related demands.

Conclusion

This study explored the lived experiences of junior auditors in Bali in forming their professional identities during the early stages of their careers. The findings show that professional identity formation is a gradual and dynamic process shaped by adaptation to audit work, experiential learning, interaction with senior auditors and colleagues, exposure to work pressure, the development of professional attitudes, and encounters with tensions involving professional principles, organizational authority, and client interests. Junior auditors do not merely internalize professional norms passively; they actively observe, experiment, evaluate, and reflect on their experiences as they develop an understanding of what it means to be a professional auditor. The essence of this experience can therefore be understood as a continuous process of becoming a professional through experiences that are encountered, observed, enacted, evaluated, and interpreted within the audit workplace.

Theoretical Contribution

The study extends Ibarra's (1999) Professional Identity Theory by illustrating how observing role models, experimenting with provisional selves, and evaluating experiments operate within the early-career auditing context.

The findings suggest that these processes are not strictly sequential but iterative and interconnected. Junior auditors repeatedly observe professional behavior, attempt to enact professional roles, receive feedback, and reassess how they wish to position themselves as auditors. Importantly, professional identity is shaped not only by positive role models but also by negative workplace experiences, which may lead junior auditors to reject certain practices and construct alternative professional ideals. The study therefore highlights professional identity formation as an active process of selection, interpretation, and reflection rather than the simple adoption of established professional norms.

Practical Implications

The findings suggest that public accounting firms should provide structured mentoring, clear supervision, constructive feedback, and gradual exposure to increasingly complex audit responsibilities. Senior auditors and supervisors play an important role not only in transferring technical knowledge but also in demonstrating professional conduct, communication, independence, and ethical judgment. Firms should also establish organizational mechanisms that support junior auditors when they encounter client pressure or potential conflicts of interest. Such support may strengthen professional confidence and help junior auditors internalize professional values through actual workplace experience rather than through formal rules alone.

Limitations

This study is limited by its phenomenological design and relatively small number of participants drawn from public accounting firms in Bali. The findings are intended to provide an in-depth understanding of participants' lived experiences rather than statistical generalization to all junior auditors. The study also focuses on auditors at an early career stage and therefore does not capture how professional identity may evolve over longer periods or across different levels of professional seniority. In addition, the findings reflect participants' retrospective interpretations of their professional experiences and may therefore be influenced by individual memory and meaning-making.

Future Research

Future research could examine professional identity formation among junior auditors in different geographical and organizational settings to explore whether similar or contrasting patterns emerge. Longitudinal studies would also be valuable for understanding how professional identity develops as auditors progress from junior to senior and managerial roles. Further research may compare experiences across different types of public accounting firms or examine the perspectives of senior auditors and supervisors to provide a broader understanding of professional socialization. Researchers may also further investigate how organizational culture, mentoring quality, ethical climate, and mechanisms for protecting auditor independence shape the development of professional identity over time.

References

- Alfina, R., Anggraini, R. D., & Widiastuti, T. (2021). Komitmen terhadap kepentingan publik: Studi perbandingan antara mahasiswa akuntansi dan auditor profesional. *Jurnal Akuntansi Multiparadigma*, 12(3), 476–490.
- Brackley, J., Channuntapipat, C., & Gebreiter, F. (2025). Refusing to play the game? Junior auditors and a standpoint perspective on audit quality in a Big-4 accounting firm. *Critical Perspectives on Accounting*, 102, 102811. <https://doi.org/10.1016/j.cpa.2025.102811>
- Fadlilah, A. H., et al. (2025). Ethical challenges and professional skepticism in the age of automated auditing. *Journal of Auditing and Ethics*.
- Ibarra, H. (1999). Provisional selves: Experimenting with image and identity in professional adaptation. *Administrative Science Quarterly*, 44(4), 764–791.
- Islamiati, H., Nuraini, A., & Ariani, N. E. (2023). Unravelling The Auditors' Dilemma: Ethics Or Money? A Case Of Indonesia Auditors. *Jurnal Reviu Akuntansi Dan Keuangan*, 13(2), 316–332.
- Moustakas, C. (1994). *Phenomenological research methods*. Sage publications.
- Parker, R. J., & Kohlmeyer III, J. M. (2005). Organizational justice and turnover in public accounting firms: A research note. *Accounting, Organizations and Society*, 30(4), 357–369. <https://doi.org/10.1016/j.aos.2004.05.001>
- Saraswati, M. (2023). Pengalaman Auditor serta Etika Profesi terhadap Penyelesaian Dilema Etika pada Kantor Akuntan Publik Kota Bandung. *Journal of Economics, Finance, and Social Science Review (JEFSOR)*, 1(2), 1–16.
- Siti Aminah, & Sokarina, A. (2025). Dilema etika dan pergulatan moral internal auditor. *Jurnal Ekonomi, Manajemen, Akuntansi dan Keuangan (EMAK)*, 6(3), 1–16.

- Widyastari, N. K. W., Badera, I. D. N., & Sisdyani, E. A. (2023). Does skepticism moderates the effect of auditor work experience, independence, and auditor training on auditor ability to detect fraud?. *International Journal of Business, Economics and Management*, 6(1), 18-26. <https://doi.org/10.21744/ijbem.v6n1.2066>
- Zarefar, A., & Zarefar, A. (2016). The Influence of Ethics, experience and competency toward the quality of auditing with professional auditor scepticism as a Moderating Variable. *Procedia-Social and Behavioral Sciences*, 219, 828-832. <https://doi.org/10.1016/j.sbspro.2016.05.074>