The Journal of Asia Entrepreneurship and Sustainability RESEARCH ARTICLE

Entrepreneurial Confidence, Persistence and Opportunity Proactivity: Examining Individual Entrepreneurial Orientation among University-Linked Learners

Dr. Pankajray Patel[1], Dr. Tushar K Panchal[2]
[1]Assistant Professor, GTU School of Management Studies, Ahmedabad, Gujarat, India.
Email id: ap_tushar@gtu.edu.in
[2]Professor, GTU School of Management Studies, Ahmedabad, Gujarat, India.
Email Id: prof_pankajraypatel@gtu.edu.in

Abstract
Purpose – Individual entrepreneurial orientation (IEO) captures innovativeness, risk-taking and proactiveness, yet its relationships with confidence and other entrepreneurial self-perceptions require careful interpretation. The investigation examines the direction and magnitude of associations between IEO and seven entrepreneurial self-ratings among university-linked respondents, with particular attention to entrepreneurial confidence, persistence and opportunity proactivity.
Design/methodology/approach – A quantitative, cross-sectional survey of 429 usable respondents in Gujarat, India, employed the ten-item Bolton–Lane IEO instrument and seven entrepreneurial self-ratings. Descriptive statistics, internal-consistency diagnostics, factorability tests and Spearman rank-order correlations were used to examine the measures and their bivariate relationships. The analysis distinguishes the theoretical propositions from the statistical associations observable in a single survey wave.
Findings – Overall IEO was moderately high (M = 3.776, SD = 0.479; Cronbach's $\alpha = 0.748$). Factorability was supported by KMO = 0.860 and Bartlett's $\chi^2(45) = 971.430$ ($p < 0.001$). IEO correlated positively with entrepreneurial confidence ($\rho = 0.419$), persistence ($\rho = 0.369$), satisfaction ($\rho = 0.356$), mindset ($\rho = 0.348$), opportunity proactivity ($\rho = 0.345$), self-rated innovation ($\rho = 0.281$) and adaptability ($\rho = 0.267$), with $p < 0.001$ for each reported relationship. The coefficients indicate positive but non-equivalent associations; they do not establish independent predictive effects or causal mechanisms.
Originality/value – The study develops an integrated behavioural interpretation of entrepreneurial orientation and related self-appraisals, and offers an actionable distinction between orientation, perceived entrepreneurial capability and verifiable entrepreneurial action. Its managerial contribution lies in proposing evidence-calibrated assessment practices for entrepreneurship education and incubation, while recognizing conceptual overlap and self-report measurement limitations.
Practical implications – Educators and incubation managers may combine orientation assessments with task-based evidence of opportunity search, iterative experimentation and persistence. Decisions about admission, funding or venture potential should not rest on self-report scores alone.

Keywords: individual entrepreneurial orientation; entrepreneurial confidence; persistence; opportunity proactivity; entrepreneurship education; business management

1. Introduction

Universities, business schools and startup incubators face a persistent evaluation problem: entrepreneurial capability is expected to develop before a new venture has generated reliable evidence of sales, financing or survival. Program managers therefore rely on intention surveys, self-assessed mindsets, pitch competitions and entrepreneurial orientation questionnaires as early indicators of progress. Such measures can be useful for reflection and program design, but they become problematic when they are interpreted as direct evidence of future venture creation. A respondent may describe a strong appetite for experimentation while having little opportunity to contact customers, obtain resources or test a business model. A meaningful management-science contribution requires an explicit separation between what individuals report about themselves and what they actually do.

Individual entrepreneurial orientation (IEO) offers one way to characterize how people approach uncertain opportunities. Building on the entrepreneurial orientation tradition, Bolton and Lane (2012) operationalized three dimensions at the individual level: innovativeness, risk-taking and proactiveness. The instrument was developed for students and individuals, making it relevant to higher education. Yet the scale does not directly measure realized business outcomes. An individual can score highly on risk-taking or proactiveness without forming a firm; conversely, a learner with modest self-ratings may develop effective

entrepreneurial practices after repeated experience. For educators and incubators, the crucial question is how orientation relates to nearer-term beliefs and habits that can be addressed through program design.

The central focus is three such perceived attributes: entrepreneurial confidence, persistence and opportunity proactivity. Confidence reflects a general self-assessment of capability in entrepreneurial settings. Persistence concerns the reported tendency to continue efforts despite obstacles. Opportunity proactivity describes a perceived inclination to identify or pursue opportunities rather than await instruction. These concepts are distinct in theory, although their empirical measures may overlap with the innovativeness and proactiveness dimensions of IEO. This overlap is analytically important: strong correlations may partly arise because two questions describe similar conduct rather than because one psychological resource causes another.

The paper is situated within business and management because the practical challenge is a managerial one: how to allocate training attention, monitor development and avoid erroneous selection decisions in entrepreneurship programs. It addresses program design and performance measurement rather than claiming that self-ratings forecast entrepreneurial success. The resulting recommendations emphasize transparent indicators, repeated feedback and the triangulation of questionnaire data with real behavioral milestones.

2. Theoretical foundation and literature review

2.1 Entrepreneurial orientation at organizational and individual levels

Entrepreneurial orientation was initially theorized as a firm-level strategic posture. Miller (1983) linked entrepreneurship to product-market innovation, risk-taking and proactive competitive behavior. Covin and Slevin (1989) developed the relationship between strategic posture and organizational context, while Lumpkin and Dess (1996) articulated a broader conceptualization including autonomy and competitive aggressiveness. At the organizational level, these concepts describe patterns in strategic decisions and organizational behavior; they should not be transferred to individuals without reconsidering their meaning and measurement.

Bolton and Lane (2012) offered a practical individual-level instrument by testing item wording relevant to people rather than firms. Their final ten-item instrument retained risk-taking, innovativeness and proactiveness. Its popularity reflects ease of administration, especially in student populations, but convenience does not eliminate conceptual concerns. Clark, Covin and Pidduck (2025) revisit the meaning and measurement of individual entrepreneurial orientation and argue for clearer alignment between conceptual definitions and item content. This contemporary measurement debate matters when researchers compare an IEO composite with other self-reported entrepreneurial attributes.

IEO is most defensibly understood here as an orientation toward particular kinds of entrepreneurial action, not as a validated measure of venture competence, commercial outcomes or business readiness. Such an interpretation preserves the practical value of the instrument without assigning it predictive claims unsupported by the present study.

2.2 Confidence, self-efficacy and perceived capability

Bandura's (1997) social cognitive theory explains why perceived capability may influence whether people approach demanding tasks, how much effort they invest and how they respond to setbacks. Entrepreneurial self-efficacy applies this logic to activities associated with venture development. Zhao, Seibert and Hills (2005) linked self-efficacy to the development of entrepreneurial intentions, illustrating the relevance of capability beliefs to entrepreneurial decision processes. However, a single general confidence rating is not interchangeable with a multi-item entrepreneurial self-efficacy scale.

Entrepreneurial confidence may reflect optimism, prior mastery, social encouragement or a respondent's tendency to provide favorable self-descriptions. It can also be miscalibrated. Excessive confidence may encourage premature commitment to an untested product or overly optimistic revenue forecasts, whereas insufficient confidence may deter beneficial experimentation. Thus, a positive confidence–IEO correlation is consistent with social-cognitive arguments but does not justify maximizing confidence as an isolated training objective.

For program management, the more useful question is whether learners' confidence becomes better calibrated to evidence. Confidence may be recorded before and after customer interviews, prototype demonstrations and pitching exercises, and compared with externally rated performance. This is a proposed future assessment strategy, not an intervention evaluated in the current survey.

2.3 Persistence and action under uncertainty

Entrepreneurial work often involves uncertain demand, resource constraints and repeated negative feedback. Persistence is therefore intuitively relevant to opportunity development. Yet persistence is not uniformly beneficial: continuing to invest in a disproven idea can destroy value. A management perspective must distinguish disciplined iteration from escalation of commitment. Entrepreneurs should persist in learning and

problem solving while remaining willing to abandon a particular solution when evidence warrants a pivot. The persistence rating in this study is a subjective report rather than an observed record of attempts, pivots or task completion. A positive correlation with IEO indicates that respondents describing themselves as persistent also tend to report a stronger entrepreneurial orientation. It does not reveal whether they persist productively or whether they have experienced meaningful entrepreneurial adversity.

Future measurement should pair persistence self-ratings with a longitudinal activity log: the number of customer discovery cycles completed, whether teams revise hypotheses after disconfirming evidence, and the proportion of planned experiments completed. These indicators could help distinguish sustained learning from mere unwillingness to change direction.

2.4 Opportunity proactivity and entrepreneurial action

Proactiveness in entrepreneurial orientation describes forward-looking initiative and anticipatory behavior. Opportunity proactivity as a self-rating may be a more immediate statement about initiating opportunity search, but the distinction is subtle. The IEO instrument already includes a proactiveness dimension, so a correlation between opportunity proactivity and overall IEO is partly a convergence test between related constructs. It should not be portrayed as an independent predictor without evidence of discriminant validity.

Shane and Venkataraman (2000) emphasized the relationship between individuals and opportunities in defining the entrepreneurship field. In educational settings, opportunity-oriented initiative can be observed when students move from a general problem statement to stakeholder interviews, competitor mapping, prototype tests or initial customer commitments. These observable actions are preferable to self-rating alone when an incubator must decide whether a team is making progress.

An applied assessment should therefore combine a questionnaire item with behavioral evidence. A learner who reports high opportunity proactivity but completes no external interviews may need support in execution. Another learner with moderate self-reported proactivity but repeated customer engagement may demonstrate stronger practical progress than the questionnaire suggests.

2.5 Mindset, innovation, adaptability and satisfaction

Entrepreneurial mindset is often used as an umbrella expression for opportunity recognition, resilience, creativity, initiative and tolerance for uncertainty. Such breadth creates a measurement challenge because a single mindset item may capture a respondent's global self-image rather than a specific capability. The same issue applies to self-rated innovation and adaptability: a person may endorse being innovative without generating or testing novel solutions, and may describe adaptability without demonstrating behavioral change after feedback.

Entrepreneurial satisfaction is even more context dependent. Respondents may be satisfied with their learning, entrepreneurial aspirations or previous activity. Unless the questionnaire wording and respondent experience are considered, satisfaction cannot be interpreted as satisfaction with actual venture performance. The positive correlation with IEO is therefore a concurrent association among self-perceptions, not evidence that entrepreneurial orientation improves satisfaction.

Comparing all seven ratings is still useful as a descriptive exercise. Differences in the magnitude of their correlations can guide the next stage of construct validation and hypothesis generation. However, confidence intervals and formal tests of differences between dependent correlations would be required before claiming that one association is statistically stronger than another.

2.6 An evidence hierarchy for entrepreneurship program evaluation

A practical evaluation framework can be organized into four levels. The first is orientation: an IEO score summarizes self-reported tendencies. The second is self-appraisal: confidence, persistence, proactivity and other ratings describe how learners perceive their capacities. The third is observed behavior: interview completion, experimental learning, prototype testing and stakeholder engagement can be documented. The fourth is venture or career outcome: market entry, sales, customer retention, employment or sustained entrepreneurial activity are observed over longer periods.

The first two levels are measured in the present dataset. The latter two are proposed extensions. Treating all four levels as if they were observed would be misleading. Instead, the framework clarifies what managers can legitimately infer from a survey and where additional evidence is needed before making resource-allocation decisions.

The framework also avoids the assumption that entrepreneurial development is linear. Some students may gain confidence after performing tasks, whereas others may begin with confidence that leads them to seek opportunities. Repeated measures and behavioral observations are needed to identify temporal ordering and reciprocal processes.

3. Research objectives and hypotheses

The study is guided by four specific objectives:

- Objective 1. To assess the level and internal consistency of individual entrepreneurial orientation among university-linked respondents using the innovativeness, risk-

taking and proactiveness dimensions.

- Objective 2. To examine the association between entrepreneurial confidence and overall individual entrepreneurial orientation.
- Objective 3. To examine the associations of persistence and opportunity proactivity with overall individual entrepreneurial orientation.
- Objective 4. To investigate the relationships of entrepreneurial satisfaction, entrepreneurial mindset, self-rated innovation and adaptability with overall individual entrepreneurial orientation, and discuss their implications for entrepreneurship education and incubation management.

Drawing on social cognitive theory and the entrepreneurial-orientation literature, the following directional hypotheses are formulated. These hypotheses concern associations rather than causal effects:

- Hypothesis H1: Entrepreneurial confidence is positively associated with individual entrepreneurial orientation.
- Hypothesis H2: Entrepreneurial persistence is positively associated with individual entrepreneurial orientation.
- Hypothesis H3: Opportunity proactivity is positively associated with individual entrepreneurial orientation.
- Hypothesis H4: Entrepreneurial satisfaction, mindset, Self-rated innovation and Adaptability is positively associated with individual entrepreneurial orientation.

The hypotheses are evaluated using bivariate Spearman coefficients. Their formulation does not imply preregistration, and statistical support must be interpreted within the cross-sectional survey design.

4. Research methodology

4.1 Research design and sampling. The investigation uses a quantitative cross-sectional survey design. A total of 429 usable responses from university-linked respondents in Gujarat, India, were retained for analysis of overall IEO. Students accounted for most of the sample and obtained through nonprobability recruitment. Accordingly, the estimates describe the surveyed participants rather than a representative population of all Indian students. The recruitment dates, exact response rate and institutional distribution should be verified from fieldwork records before submission.

4.2 Variables and measurement. Individual entrepreneurial orientation was measured using the ten-item Bolton and Lane (2012) instrument encompassing innovativeness, risk-taking and proactiveness. The composite was calculated on the reported five-point response scale. Entrepreneurial confidence, persistence, satisfaction, mindset, opportunity proactivity, self-rated innovation and adaptability were included as seven separate self-rating measures. Without the complete questionnaire, these ratings cannot be represented as validated multi-item constructs or treated as interchangeable with entrepreneurial self-efficacy scales.

4.3 Analytical strategy. First, the central tendency and dispersion of overall IEO were assessed. Second, Cronbach's alpha was used to assess composite internal consistency; the Kaiser–Meyer–Olkin statistic and Bartlett's test assessed the suitability of the item matrix for dimensional exploration. Third, Spearman's rho was used to test monotonic associations between IEO and the seven self-ratings. This rank-based approach accommodates ordinal response characteristics without requiring normally distributed item-level ratings.

4.4 Statistical interpretation. All hypothesis tests are two-sided based on the available results, and $p < 0.001$ is reported where supported. Positive coefficients support the specified directional hypotheses at the bivariate level. Correlations are not adjusted for intercorrelations among self-ratings or demographic covariates. Exact pairwise sample sizes, confidence intervals, tests comparing dependent correlations and multivariable coefficients require access to the respondent-level dataset; these statistics are not fabricated here.

4.5 Measurement quality and ethics. A reverse-worded innovativeness item displayed method-like behaviour, warranting caution in dimension-level interpretation. The study relies on self-reports collected in a single survey wave, creating possible common-method and social-desirability effects. The authors should insert confirmed ethics approval or exemption, informed-consent procedures, funding and conflict-of-interest declarations before journal submission.

5. Data analysis and results

5.1 Descriptive statistics and measurement diagnostics.

Table 1 presents the principal sample and scale diagnostics. The overall IEO mean of 3.776 suggests relatively favourable self-reported entrepreneurial orientation within the five-point scoring scheme. The standard deviation of 0.479 indicates some variation in orientation across respondents, although the composite mean should not be used as a benchmark for the wider student population. Cronbach's alpha of 0.748 is consistent with acceptable internal consistency for exploratory analysis; it does not, by itself, establish unidimensionality or measurement invariance.

Measure	Value	Analytical interpretation
Valid IEO responses	429	Usable overall composite observations
Overall IEO mean	3.776	Above scale midpoint
Overall IEO SD	0.479	Dispersion around the composite mean
Cronbach's alpha	0.748	Exploratory internal consistency
KMO	0.860	Adequate item correlation structure
Bartlett's test	$\chi^2(45) = 971.430$; $p < 0.001$	Rejects identity correlation matrix
Risk-taking	M = 3.797; SD = 0.632	Dimension descriptive
Innovativeness	M = 3.657; SD = 0.522	Interpret with reverse-item caution

5.2 Hypothesis testing: entrepreneurial self-ratings and IEO

Table 2 reports the Spearman correlations. Each coefficient is positive and statistically significant at $p < 0.001$. The largest observed correlation is for entrepreneurial confidence ($\rho = 0.419$), consistent with the social-cognitive argument that perceived entrepreneurial capability accompanies innovative, proactive and risk-accepting orientation. Persistence ($\rho = 0.369$) also displays a positive moderate association, suggesting that respondents reporting greater willingness to continue efforts tend to report stronger IEO. Opportunity proactivity ($\rho = 0.345$) is positively related to the composite; because proactiveness is also an IEO dimension, this association should be interpreted with attention to conceptual overlap.

Hypothesis	Entrepreneurial self-rating	Spearman ρ	Significance	Bivariate decision
H1	Confidence	0.419	$p < 0.001$	Supported
H2	Persistence	0.369	$p < 0.001$	Supported
H3	Opportunity proactivity	0.345	$p < 0.001$	Supported
H4a	Satisfaction	0.356	$p < 0.001$	Supported
H4b	Mindset	0.348	$p < 0.001$	Supported
H4c	Self-rated innovation	0.281	$p < 0.001$	Supported
H4d	Adaptability	0.267	$p < 0.001$	Supported

5.3 Interpretation of the secondary self-ratings

Entrepreneurial satisfaction ($\rho = 0.356$) and mindset ($\rho = 0.348$) exhibit positive associations comparable in magnitude to persistence and opportunity proactivity. These relationships may reflect favourable entrepreneurial self-perceptions, but the meaning of satisfaction depends on its questionnaire referent. Satisfaction with learning or aspirations should not be interpreted as satisfaction with venture outcomes. The mindset item may summarize several tendencies, including initiative and optimism, and should not be treated as a psychometrically established multidimensional scale without additional validation.

Self-rated innovation ($\rho = 0.281$) and adaptability ($\rho = 0.267$) display smaller but still positive correlations with IEO. Their relatively lower coefficients do not demonstrate that innovation or adaptability is less important to entrepreneurship. Instead, the ratings may be narrower, more subjective or less closely aligned with the composite wording. Direct comparisons of the statistical differences among these dependent correlations are not available, and no claim of significant superiority of one coefficient over another is made.

5.4 Consolidated hypothesis assessment

All directional hypotheses receive support at the level of positive bivariate association. This pattern accords with the proposition that individual entrepreneurial orientation is connected with perceived entrepreneurial capabilities and action

tendencies. However, hypothesis support here means only that the sign and reported significance of each correlation align with its statement. It does not demonstrate that the seven attributes uniquely predict IEO, explain causal variation, or mediate one another. Nor does it demonstrate entrepreneurial performance, because no objective venture outcomes are included in these tests.

5.5 Robustness, overlap and analytical boundaries

Three methodological considerations qualify the findings. First, all variables are self-reported, so acquiescence and common-method variance may increase the observed associations. Second, opportunity proactivity and self-rated innovation overlap in content with two IEO dimensions, making discriminant-validity checks especially relevant. Third, valid pairwise sample sizes may differ because of missing responses to individual self-ratings. Further analysis using raw data should report exact N for each pair, 95% confidence intervals, sensitivity tests for the reverse-worded item and a multivariable model with appropriate diagnostics. These are recommended extensions, not analyses claimed as completed.

6. Discussion

The most notable feature of the observed pattern is the positive relationship between general entrepreneurial confidence and the IEO composite. From a social-cognitive perspective, this is plausible: individuals who feel capable of engaging with uncertain tasks may also describe themselves as innovative, proactive and willing to accept risk. Yet a cross-sectional questionnaire cannot distinguish whether confidence encourages orientation, orientation reinforces confidence, or both reflect prior experiences and response style. The finding is therefore best viewed as a signal for further study of calibration and action rather than as a causal explanation.

Persistence is also positively related to IEO. This matters for educators because entrepreneurial learning often requires iteration across ambiguous feedback. Nevertheless, the distinction between productive persistence and escalation of commitment is central. Programs that simply reward continuing despite failure could inadvertently reinforce poor decisions. Better evaluation would assess whether students articulate falsifiable assumptions, collect relevant evidence and modify their approaches after setbacks. A future longitudinal study could test whether such observed learning behaviors mediate any relationship between baseline persistence ratings and venture progress.

Opportunity proactivity occupies an intermediate conceptual position. It is closely aligned with the proactiveness component of IEO and also resembles the initiative required for customer discovery. Its correlation is therefore theoretically unsurprising but not necessarily evidence of an independent managerial capability. Researchers should inspect item wording, assess discriminant validity and compare self-reports with external evidence before making claims about opportunity enactment. Program managers can nonetheless use the concept to prompt specific tasks, such as conducting interviews or identifying underserved user groups.

The positive associations involving satisfaction and broad entrepreneurial mindset also require care. Respondents with favorable self-perceptions may answer several questions positively, producing a common-method pattern. Satisfaction could refer to learning, aspirations or existing entrepreneurial engagement; without contextual specificity, it should not be interpreted as venture success. Similarly, a global mindset rating is useful as a conversation starter but weak as a high-stakes performance metric. The data justify descriptive convergence, not construct equivalence.

The smaller coefficients for adaptability and self-rated innovation do not mean these qualities are less valuable in actual entrepreneurship. Their lower associations may reflect narrower question wording, differences in interpretation or limited reliability of single-item measures. Innovation is especially difficult to assess through self-description because originality and commercial usefulness require evaluation against alternatives and user needs. Adaptability likewise becomes visible when individuals change course in response to evidence. Future research should use behavioral tasks and independent ratings alongside self-report items.

These distinctions clarify the management-science contribution of the study. Orientation is one layer of entrepreneurial development; self-appraisal is another; observable action is a third. Conflating the layers creates risks for curriculum evaluation and incubator selection. Separating them permits more precise feedback: learners may need to build confidence, translate intention into initiative, improve evidence gathering or develop commercial execution skills. Each need suggests a different educational response.

Finally, the present findings should be interpreted within their student-dominant regional context. University learners are not equivalent to experienced founders, employees or managers. They may have strong entrepreneurial aspirations but limited exposure to resource constraints, customers and market feedback. The implications are therefore most immediate for developmental learning environments. Generalization to incubated growth-stage startups, family businesses or working professionals requires fresh sampling and construct validation.

7. Implications for business education and incubation management

7.1 Design programs around evidence-calibrated confidence

Confidence-building should be paired with progressively difficult tasks and objective feedback. An introductory activity may require each student to explain a problem and its intended user; the next may require five customer conversations, a simple prototype and a documented revision of the original assumption. Students can rate confidence before and after each task, but the score should be compared with evidence of completion and learning. This creates an opportunity to investigate whether confidence becomes more realistic over time rather than merely increasing.

Facilitators should normalize uncertainty and encourage learners to state what they do not yet know. Feedback should distinguish communication quality, technical feasibility and evidence of demand. A polished pitch without customer validation should not receive the same developmental assessment as a weaker presentation supported by careful experimentation. Such differentiation discourages superficial self-assurance.

7.2 Operationalize persistence as disciplined experimentation

Persistence can be developed through short, repeated learning cycles. Teams might document an initial hypothesis, specify a test, record negative feedback, decide whether to continue or pivot and explain the decision. Managers can monitor task completion, quality of reflection and responsiveness to evidence rather than praising endurance alone. The aim is sustained learning under uncertainty, not indefinite commitment to one idea.

A useful program rule is to separate persistence in the entrepreneurial goal from attachment to a particular solution. A team may remain committed to addressing a customer problem while abandoning a prototype that does not work. Such a distinction is consistent with adaptive management and provides a more responsible training target than an undifferentiated persistence score.

7.3 Translate opportunity proactivity into observable milestones

Incubation managers can convert opportunity proactivity into specific behaviors: initiating stakeholder contact, mapping alternatives, identifying a measurable pain point, scheduling interviews and testing willingness to pay. These milestones are not validated by the current survey, but they are more auditable than a single self-rating. A simple evidence portfolio can include interview notes, test results, iteration logs and the rationale for subsequent decisions.

The same framework can be applied to regional innovation hubs or university entrepreneurship courses with different resource levels. Low-cost interviews and problem validation may precede expensive prototyping. This staged approach reduces the chance that program managers confuse enthusiasm with market readiness.

7.4 Avoid using IEO as a selection or exclusion test

The findings reported here do not justify ranking students for grants, incubator entry or academic progression based on IEO or confidence scores. Such uses would require predictive validity, fairness evaluation, measurement invariance and explicit governance. Self-report scores can be affected by language, social desirability and respondents' prior exposure to entrepreneurial vocabulary. Excluding students with lower scores could deny them precisely the learning opportunities that a developmental program is meant to provide.

Instead, IEO can be offered as voluntary developmental feedback alongside demonstrated behavior and mentoring assessments. Students should understand the purpose of the measure, how their data will be used and the limits of its interpretation. Individual results should not be presented as stable personality labels.

7.5 Proposed four-stage evaluation dashboard

Table 3. Proposed management evaluation framework. Stages 3 and 4 are recommendations for future measurement and were not measured in the present dataset.

An implementation plan could collect baseline IEO and self-appraisals at entry, assess observable actions at the end of each instructional module, and collect follow-up outcomes after six and twelve months. Independent mentors could rate evidence quality using a standardized rubric. Program evaluators should predefine primary outcomes, document missing data and distinguish within-person improvement from differences caused by changing cohort composition. A comparison group or randomized rollout would be needed to attribute changes to the program rather than maturation or selection.

Entrepreneurial intention models distinguish perceived capability and planned action from actual venture behavior (Ajzen, 1991; Bird, 1988; Krueger et al., 2000; Liñán & Chen, 2009). Entrepreneurial self-efficacy research similarly emphasizes task-specific beliefs and their educational antecedents (Chen et al., 1998; McGee et al., 2009; Wilson et al., 2007). Studies of entrepreneurship programmes highlight the importance of learning, inspiration and resources rather than treating confidence alone as an outcome (Souitaris et al., 2007). The individual-level evidence on entrepreneurial readiness (Adeniyi et al., 2024), together with personality meta-analysis (Rauch & Frese, 2007), supports treating the

observed correlations as developmental indicators, not proof of entrepreneurial success.

Table 3. Proposed four-stage evaluation framework

Stage	Indicator	Evidence source	Caution
Orientation	IEO score and dimension feedback	Validated questionnaire	Not a venture-outcome measure
Self-appraisal	Confidence, persistence, proactivity	Repeated self-report	Response style may influence ratings
Behavioural enactment	Interviews, tests, prototype iteration	Activity logs and mentor review	Not measured in this survey
Venture outcomes	Customer adoption, revenue, survival	Verified follow-up records	Not measured in this survey

8. Limitations and directions for future research

The evidence comes from a cross-sectional, student-dominant and geographically concentrated nonprobability sample. It cannot support population prevalence estimates or generalization to all university students, working professionals or founders. The precise recruitment frame and response rate need verification from the original field records. Such information should be reported transparently rather than reconstructed retrospectively.

All substantive associations reported here involve self-reported measures collected within the same survey. Common-method variance, social desirability, acquiescence and conceptual overlap could inflate correlations. The reverse-worded innovativeness item further complicates interpretation of the IEO construct. Further research could pretest translations and wording, report item-level diagnostics and evaluate convergent and discriminant validity using an appropriate measurement model.

The correlations are bivariate. They do not show whether confidence, persistence or opportunity proactivity uniquely explains IEO after accounting for other ratings. Formal comparison of dependent correlations, confidence intervals, multiple-testing considerations and sensitivity analyses would improve inferential rigor. Reanalysis should be performed from the verified raw dataset and reproducible code rather than approximating statistics from published tables.

Further research could distinguish entrepreneurial confidence from validated task-specific entrepreneurial self-efficacy. It should also specify the referent of satisfaction and measure adaptability through responses to actual changes in task conditions. Multi-source evidence—such as mentor ratings, activity logs and independent assessments of prototype quality—would help establish whether survey responses correspond to behavior.

Longitudinal studies can test whether baseline IEO and self-appraisals predict subsequent customer discovery, prototype iteration, venture entry or career decisions. Intervention studies can evaluate whether structured experiential training changes these measures and whether observed changes translate into durable outcomes. Designs should account for prior entrepreneurial experience, educational exposure, institutional resources and family context.

9. Conclusion

Among 429 university-linked respondents, overall individual entrepreneurial orientation was moderately high and showed positive associations with seven entrepreneurial self-ratings. Confidence exhibited the largest reported coefficient, followed by persistence, satisfaction, mindset and opportunity proactivity, while self-rated innovation and adaptability had smaller positive relationships. These findings provide evidence of concurrent self-perceptual convergence, not of causal influence, intervention effectiveness or future venture performance.

The principal contribution of this article is to distinguish entrepreneurial orientation from self-assessed capability and verified entrepreneurial conduct. That distinction offers a more responsible basis for program design: educators can help learners calibrate confidence, persist through evidence-based iteration and initiate opportunity-search activities, while incubators can document behavior and outcomes rather than relying on self-reported enthusiasm. The proposed four-stage assessment framework requires prospective validation. Its value is to make managerial assumptions testable and to prevent questionnaire scores from being used as unsupported proxies for entrepreneurial success.

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