

Multigroup Exploratory Factor Analysis of Entrepreneurial Characteristics: Differences by Firm Size and Revenue in Japan

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Abstract

Latent structure of entrepreneurial characteristics in Japan by integrating internal factors (mindset/skillset) and external factors that constitute the entrepreneurial ecosystem (EE). Building on a qualitative model (EC model), we fielded a June 2025 survey of entrepreneurs ($n=604$) and conducted exploratory factor analyses (ML extraction, Promax rotation) for the full sample and subgroups by employee size ($1-5$ vs. ≥ 6) and annual revenue ($<¥50M$ vs. $\geq ¥50M$). To enable cross-group comparability, dimensionality was fixed at five, guided by free-exploration criteria. Item adoption primarily used $|\text{loading}| \geq .40$ with theory-guided handling of cross-loadings. Results indicate label-level reproducibility of Public Support and Innovation Execution, but limited item-level overlap, and a context-dependent factor (F3) whose composition shifts with scale. Congruence with the full solution is high for the employee split (e.g., $\varphi \approx .998$; .976) but weaker for the lower-revenue group, while reliability generally exceeds practical thresholds. These findings imply that interventions should combine a minimal common core with stage-specific modules, and that factor comparisons should be anchored to labels rather than numbers. We outline a path toward multigroup CFA for measurement invariance and structural equation modeling to test mediation and moderation, moving from uniform, average-case policies to scale-appropriate design. Implications for policy and practice follow.

Keywords: Entrepreneurial Characteristics, Entrepreneurial Ecosystems, Mindset and Skillset, Entrepreneur, Entrepreneurship

1 Introduction

The background for Japan's relatively low level of entrepreneurial activity, compared with other advanced economies, is understood to stem from the interaction between internal, individual-level factors (mindset and skillset) and external factors—namely, the institutions, culture, and resources that make up the entrepreneurial ecosystem (hereafter, EE). Building on our prior qualitative research, we have proposed an integrative hypothetical framework—the Entrepreneurial Characteristics Model (hereafter, EC model)—that articulates the relationships between these internal and external factors. In a pilot survey conducted in April 2025 ($n = 106$), exploratory factor analysis (EFA) yielded findings consistent with the EC model, suggesting latent structures such as Entrepreneurial Drive, Sense of Purpose, and Environmental Readiness. However, the pilot was constrained by its sample size. We recognized this result alone is insufficient to discuss the characteristics of Japanese entrepreneur. There remained room for further examination of structural changes corresponding to firm size, such as organizational structure and sales.

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Therefore, this study aims to discover new factors related to entrepreneurial traits. To achieve this, it retains the EC model as the measurement anchor while conducting a multigroup EFA based on a large sample ($n=604$), dividing firms into groups by employee size (1–5 employees / 6 or more employees) and sales size ($<¥50M$ / $≥¥50M$).

Methodologically, we use maximum likelihood for factor extraction and Promax rotation to allow correlations among factors. To ensure commensurate dimensionality for cross-group comparisons, we fix the number of factors at five in light of the variability indicated by free-exploration criteria (parallel analysis and MAP). Item selection primarily follows the criterion $|loading| ≥ .40$; cross-loadings are handled with attention to theoretical coherence and cross-group consistency. We evaluate structural proximity using both item-set overlap (Jaccard) and aligned congruence on the common items (Tucker's congruence coefficient ϕ). This design aims to (i) examine factor counts, item placement, and internal consistency; (ii) distinguish group-specific "cores" from "variable" components; and (iii) derive measurement implications suited to the Japanese context.

The contributions of this study are fourfold. First, methodologically, we clarify and operationalize "label-level reproducibility" for cross-group comparisons by fixing a theory-anchored common coordinate system and jointly using Jaccard (shared item sets), Procrustes-aligned Tucker's ϕ (factor congruence), and $|\Delta loading|$ (loading shifts). Second, using a large Japanese sample ($n = 604$), we examine the factor structure of the EC model in a domestic context and quantitatively identify context-specific refinements in entrepreneurial characteristics. Third, we provide empirical evidence that can inform the design of entrepreneur support and policy by organizational and market scale indicators (employees and sales). Finally, we provide a foundation for subsequent tests of measurement invariance (multigroup CFA) and the refinement of causal hypotheses (SEM), thereby charting a pathway from uniform, average-case interventions to stage-appropriate intervention design.

The structure of this paper is as follows. Section 2 reviews prior research on internal factors and on the EE, and clarifies the positioning of the EC model. Section 3 describes the scale development, sampling, EFA procedures, and multigroup comparison design. Section 4 reports factor solutions, reliability, and congruence for the full sample and subgroups. Section 5 discusses theoretical implications, practical implications, and considerations regarding the number of factors. Section 6 presents limitations and future directions, and Section 7 concludes the paper.

2 Related Work

2.1 Research on Internal Factors of Entrepreneurs

Prior studies examining entrepreneurial activity have largely focused on individual-level internal characteristics. Psychological factors such as self efficacy, risk tolerance, achievement motivation, career fulfillment, and the desire for self actualization have repeatedly been shown to influence entrepreneurial decision making and behavioral tendencies [1] [2][3].

The influence of the internal factor "mindset" on entrepreneurial behavior has been studied under the label entrepreneurial mindset (EM). EM refers to the capacity to recognize opportunities and move to action, make decisions under limited information, and often navigate uncertain and complex situations [4]. By contrast, skillset is generally defined as the practical abilities, knowledge, techniques, and experience required to carry out work [5].

Studies that examine the relationship between skillset and mindset report, for example, that individuals with a growth mindset tend to adapt flexibly to environmental changes and are

more willing to acquire new skills [6]. This has drawn attention to the interaction between practical know how and internal attitudes. From this perspective, entrepreneurial capability formation is not attributed to innate endowment but is thought to be dynamically shaped through interaction with the environment and through experience.

2.2 Structure and Research Trends of the Entrepreneurial Ecosystem

Entrepreneurial Ecosystem (EE) has gained significant attention in entrepreneurship research. EE encompasses the external environment necessary for entrepreneurial activity, including policy, finance, culture, support, human capital, and markets [7]. It demonstrates a causal structure where the interconnected components of the EE generate entrepreneurial outcomes [8] [9]. A key characteristic of EE research is its emphasis on a dynamic perspective—focusing not merely on listing individual factors, but on how they interact with each other.

However, these models were primarily constructed based on Western contexts. Japan's EE faces unique challenges, including low human resource mobility, insufficient societal understanding of entrepreneurship, and institutional fatigue within support systems. Consequently, EE research grounded in Japan's domestic entrepreneurial culture and institutional background is scarce, and the discussion remains inadequate [10].

Furthermore, past research has focused on understanding the conditions for entrepreneurship at the macro level, rather than from the perspective of individual entrepreneurs [11]. It has pursued a one-size-fits-all general theory, failing to consider the differences in time, people, and place that entrepreneurs experience and confront in their activities [12]. To address these challenges, this study conducts exploratory analysis based on large-scale survey results from entrepreneurs who started businesses in Japan and managed them for over five years. Participants are grouped by organizational scale (e.g., sales volume, number of employees). The objective is to identify stage-specific challenges by understanding entrepreneur characteristics within the Japanese context and from the entrepreneur's perspective.

2.3 The EC Model (Entrepreneurial Characteristics Model) and the Positioning of This Study

This section integrates the internal factors (Skillset and Mindset) described in Section 2.1 with the Entrepreneurial Ecosystem (EE) defined in Section 2.2, presenting the positioning of the EC model within this study and verifiable hypotheses. The EC model was proposed in our previous qualitative research (Figure 1) and visualizes the process by which internal factors and the external EE function complementarily [1]. A key feature of the EC model is that it goes beyond the static listing of components in conventional EE models and focuses instead on the *relationships* between internal and external factors from the entrepreneur's perspective. Specifically, the strengthening of mindset promotes the formation of human networks, which in turn generates relationships with customers and partners; accumulated implementations

(e.g., prototypes, pilots) then feed back into entrepreneurial confidence and goal persistence.

From a measurement standpoint, we expect EFA to reveal (i) cohesion within the internal-factor block, (ii) differentiation within EE substructures (e.g., the separation of market

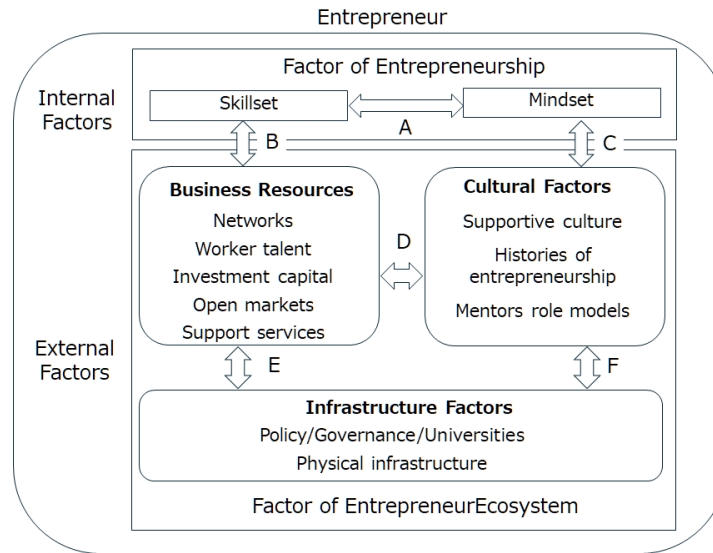


Figure 1: EC Model (conceptual flow)

access and implementation infrastructure), and (iii) the positioning of Readiness as a “bridge” (loading nearer to either internal or external factors depending on context). In particular, increases in organizational scale (employees, revenue) tend to diversify actual EE usage and institutionalize processes, potentially inducing factor differentiation.

Based on the above, we formulate the following hypotheses.

- ♦ H1 (Replicability hypothesis). In the full sample, cohesive internal-factor components corresponding to Drive and Purpose will be replicated.
- ♦ H2 (Differentiation hypothesis: EE). In smaller organizations (1–5 employees; revenue < ¥50M), EE-related items are more likely to appear as a relatively unified factor, whereas in larger organizations (≥ 6 employees; revenue \geq ¥50M) “market access” and “implementation infrastructure” will differentiate into distinct factors.
- ♦ H3 (Availability–Usage bifurcation). As organizational scale increases, perceived availability of EE and actual usage experience will be more readily identified as separate dimensions.
- ♦ H4 (Bridge hypothesis: Readiness). In smaller organizations, Readiness tends to be proximal to internal factors (especially Drive), while in larger organizations it tends to be proximal to the EE (especially implementation infrastructure) or to exhibit cross-loadings.
- ♦ H5 (Interrelation hypothesis: inter-factor correlations). Correlations between EE factors and Drive/Purpose will adjust to weak-to-moderate levels with increased scale, reflecting clearer functional division. (If overall correlations are too high, this would imply under-differentiation of the constructs.)

For purposes of multigroup analysis, Chapter 4 delineates factor stability into “core” versus “variable.” Operationally, (a) items that load on the same factor in both scale groups and satisfy $|\text{loading}| \geq .40$ are treated as the *core*, whereas (b) items whose placement differs

across groups or whose $|\text{loading}| < .40$ are treated as *variable*. Structural proximity across groups is assessed using item-set overlap (Jaccard) and aligned congruence on common items (Tucker's congruence coefficient ϕ). When Jaccard is moderate (e.g., 0.4–0.6) but ϕ remains high (e.g., $\geq .95$), we interpret this as “core placements are approximately consistent while peripheral items are being reallocated,” and so forth.

Importantly, the EC model is not intended to *end* with an EFA solution; rather, it is designed as a hypothesis-generation device for subsequent CFAs that test measurement invariance (configural, metric, and scalar). By doing so, we obtain the basis to derive practical implications—such as identifying which EE elements tend to emerge as “bottlenecks” for different scales, and which EE components most effectively reinforce the plasticity of internal factors. In sum, the EC model provides an integrative framework that simultaneously captures the cohesive plasticity of internal factors and the stage-dependent differentiation of the EE. The next chapter (Section 3) specifies the corresponding measurement design (scale blocks, factor-extraction conditions, groupwise estimation, and stability indices) and clarifies the analysis procedure.

3 Research Methodology

3.1 Hypothetical Model and Measurement Structure

In this study, we model the internal factors (mindset and skillset) that influence entrepreneurial decision-making among Japanese founders together with the external factors (business resources, cultural attributes, and implementation infrastructure) that constitute the entrepreneurial ecosystem (EE). We then develop a measurement scale to test the structural hypotheses of this Entrepreneurial Characteristics Model (EC model). The scale was created on the basis of insights from our prior qualitative work; we extracted perspectives necessary for hypothesis testing and completed the instrument through a multi-stage process.

First, referring to the EC model's structure (Mindset \leftrightarrow Skillset \rightarrow External Factors), we mapped measurement items to the conceptual content of each component. Items were initially derived from interview evidence and prior studies and refined through expert review. Next, a pilot survey of actual entrepreneurs was used to make context-appropriate adjustments and to secure content validity.

This paper implements a cross-sectional analysis aimed at re-examining the EC model and conducting multigroup comparisons. Building on the items used in the pilot, the measurement blocks comprise internal factors—Entrepreneurial Drive (intrinsic motivation, performance orientation, self-efficacy), Sense of Purpose (long-term orientation and goal consistency), and Environmental Readiness (readiness to connect to and leverage external resources)—and EE-related factors that capture both perceived availability and actual usage of external resources. To mitigate social-desirability bias, we randomized item order and interleaved items across blocks. As quality control, we included attention checks and removed straight-lining responses, abnormally short completion times, and duplicates.

In addition to an EFA on the full sample, we stratify by employee size (1–5 vs. ≥ 6) and annual revenue ($< ¥50\text{M}$ vs. $\geq ¥50\text{M}$) and re-estimate solutions with the number of factors fixed at five. Item adoption primarily follows the threshold $|\text{loading}| \geq .40$, while cross-loadings are adjudicated with reference to theoretical coherence and cross-group consistency. Structural proximity is assessed via item-set overlap (Jaccard) and aligned loading congruence on common items (Tucker's ϕ), which then feed into the results in Section 4 and the discussion in

Section 5. Ethical safeguards—explicit informed consent, anonymization, and purpose limitation—were observed.

3.2 Scale Item Development

Scale development proceeded through the following steps.

(1) Generating initial items from theory. In the EC model, Mindset (entrepreneurial spirit) and Skillset (practical capability) play central roles. Mindset components include risk tolerance, challenge orientation, and intrinsic motivation; Skillset components include strategy-building, resource orchestration, and market sensing. For external factors, guided by EE models such as Stam and Spigel, we selected domains like financing, public support schemes, and cultural attitudes toward entrepreneurship.

(2) Reinforcing items using qualitative interviews. In a separate preliminary study, we conducted semi-structured interviews with 16 entrepreneurs. The analysis surfaced internal and external determinants of behavior and decision-making. Illustrative comments included: “We leveraged a trusted referral network,” “At start-up, both programs and personal ties were effective for raising seed capital,” and “A strong sense of self-efficacy pushed me to keep challenging myself.” These findings were used to enrich and anchor the item pool.

(3) Revising items and concretizing content. Based on the qualitative evidence, we drafted 38 five-point Likert items for each construct. Example items include: “I persist and stay proactive even in difficult situations,” “I can maintain purpose-driven goals over the long term,” and “My business has a trusted support network.” The items were designed to cover each construct’s conceptual domain while remaining intuitive for practitioners to answer.

(4) Final composition and preparation for reliability checks. Items were reviewed along four criteria—theoretical validity, practical applicability, answerability, and factor independence. The EFA would then identify the latent structure, with provision for consolidating or removing items as needed. This prepared the ground for testing the scale’s structural validity as a prerequisite for statistical tests of the hypothesized model.

3.3 Sample and Data Collection Overview

The target survey was administered online in June 2025 to entrepreneurs in Japan with start-up experience; valid responses totaled $n = 604$. Recruitment balanced regional and industry dispersion to the extent feasible. Respondents provided informed consent and were assured anonymization and purpose-limited use. The questionnaire first captured demographics and business attributes (e.g., employee size, annual revenue), followed by the EC model items. For each item, we indicated whether it belonged to the internal block (Drive, Purpose, Readiness) or to the EE block (business resources, cultural factors, implementation infrastructure) to maintain clarity of construct coverage while preserving randomized presentation. Detailed respondent attributes are organized in Table 1 and Table 2.

The dataset of 604 Japanese entrepreneurs used in this study is also analyzed in our related manuscript (currently under peer review). That study employs CFA/SEM to test the structural validity and mechanisms of the EC model, whereas the present article confines itself to multigroup EFA (by firm size and revenue), comparing label-level replication and context-dependent reconfiguration using Jaccard indices, mean absolute loading differences, and Tucker’s ϕ . The aims, methods, and claims are distinct. Upon acceptance, we will cross-reference the two papers and avoid content overlap.

Table 1: Cross-Tabulation of Age Group and Gender Count ($n = 604$)

Age Group	Male	Female	Total	Percentage(%)
30–39	2	2	4	0.7%
40–49	47	3	50	8.3%
50–59	169	6	175	29.0%
60–69	244	8	252	41.7%
70 and over	117	6	123	20.4%
Total	579 (95.9%)	25 (4.1%)	604	100.0%

Table 2: Cross-Tabulation of Annual Revenue and Employee Count ($n = 604$)

Annual Revenue (JPY)	≤5 employees	≥6 employees	Total
< ¥50 million	378	15	393 (65.1%)
≥ ¥50 million	81	130	211 (34.9%)
Total	459 (76.0%)	145 (24.0%)	604 (100.0%)

Note (Tables 1–2).

1. n denotes the number of respondents ($n = 604$).
2. The dataset is the same as that used in a related manuscript currently under review; variables are tabulated here to define EFA groups only. CFA/SEM results are not reported in this article.

3.4 Exploratory Factor Analysis (EFA)

To clarify the factor structure of the scale items, we conducted EFA following the steps and criteria below.

(1) Analysis method. We used maximum likelihood for factor extraction and Promax rotation to allow correlations among factors. Given the aim of testing a theoretically guided structure (the EC model), this combination was judged suitable for balancing theoretical coherence and statistical adequacy.

(2) Determining the number of factors. Free-exploration criteria (parallel analysis and MAP) suggested 6–9 factors across groups, indicating that some portions of the construct space may split into finer-grained subdimensions depending on context. However, the primary objective of this paper is not to optimize the factor count separately within each subgroup, but to evaluate label-level reproducibility and context-dependent reconfiguration under a commensurate measurement frame. Because the scale was designed with the EC model as a measurement anchor—covering five conceptual blocks (Mindset, Skillset, Business Resources, Cultural Factors, Infrastructure)—we imposed a five-factor frame as a theory-anchored “common coordinate system” for all groups. This choice enables like-for-like comparisons of (i) item adoption/overlap (Jaccard), (ii) loading shifts on commonly adopted items ($|\Delta\text{loading}|$), and (iii) aligned congruence after Procrustes matching (Tucker’s ϕ), which all presuppose shared dimensionality and an interpretable common core. We acknowledge that fixing at five may compress finer substructures implied by PA/MAP, and therefore treat the 6–9 range as candidate dimensionalities for sensitivity analyses at the model-refinement stage (see Section 5.3).

(3) Item evaluation criteria. Items with $|\text{loading}| < .40$ were candidates for removal. Items with substantive cross-loadings ($\geq .30$ on two or more factors) were reviewed in light of theoretical meaning and cross-group behavior and removed if warranted.

(4) Label alignment across groups. Comparisons are consistently anchored to factor labels (semantic content) rather than factor numbers. Using the Full-sample solution as a reference template, each subgroup solution was Procrustes-aligned and matched to the template factor that maximized Tucker's ϕ . When label-level replication was confirmed, cross-group comparisons proceeded on that basis; ϕ was not computed for factor pairs with no commonly adopted items.

(5) Naming factors. Extracted factors were named to reflect their substantive content while maintaining consistency with the EC model blocks (Mindset, Skillset, Business Resources, Cultural Factors, Infrastructure). Details of naming are provided in Section 4.

(6) Multigroup analysis. In addition to the Full sample, we estimated five subsets: employee size (1–5; ≥ 6) and revenue ($< ¥50M$; $\geq ¥50M$), applying steps (1)–(5) to each. We then compared solutions using Jaccard coefficients (item-set overlap) and Tucker's ϕ (congruence on common items).

(7) Proximity indices (definitions). After label alignment (Procrustes), for each commonly adopted item i , we computed the absolute loading difference for the matched factor across groups A and B, $|\lambda_{iA} - \lambda_{iB}|$, and summarized it by the mean absolute loading difference over the set of common items (restricted to items with $|\text{loading}| \geq .40$).

4 Results

4.1 Identification of Factor Structure

Using maximum likelihood (ML) extraction with Promax rotation on the present dataset ($n = 604$), we estimated solutions for the Full sample as well as by employee size (1–5 vs. ≥ 6) and by annual revenue ($< ¥50M$ vs. $\geq ¥50M$), fixing dimensionality at five factors in every estimation. We adopted this fixed dimensionality because free-exploration criteria (e.g., parallel analysis and MAP) dispersed the recommended factor count between six and nine across groups, and we needed to ensure commensurate dimensionality for cross-group comparison (see Section 3.4 for procedural details and Section 5.3 for the rationale for fixing the number of factors).

Table 3 Factor Name List

	full	employee_1_5	employee_6p	revenue_<¥50M	revenue_≥¥50M
F1	Entrepreneurial Skillset and Mindset	Entrepreneurial Skillset and Mindset	Entrepreneurial Skillset and Mindset	Entrepreneurial Skillset and Mindset	Strategic Growth Initiatives
F2	Business and Culture Resources	Business and Culture Resources	Public Support Innovation Execution	Business and Culture Resources	Public Support
F3	Public Support	Public Support		Public Support	Innovation Execution
F4	Innovation Execution	Innovation Execution	Business Resources	Innovation Execution	N.A.
F5	N.A.	N.A.	N.A.	N.A.	N.A.

Factor names were aligned to F1–F5 for all groups (Table 3). The primary adoption criterion was $|\text{loading}| \geq .40$; items with cross-loadings ($\geq .30$) were treated as candidates for removal.

- ♦ Full (overall). Within the five-factor frame, F5 did not materialize (N.A.), yielding an effective four-factor solution. Nevertheless, the factor labels formed coherent clusters consistent with the EC model (e.g., Mindset / Skillset / External Resources).
- ♦ Employees 1–5. While sharing high commonality with the Full solution, this subgroup shows relatively stronger colorings of nearby support/grassroots networks and basic operational routines.
- ♦ Employees ≥ 6 . Features characteristic of a scaling stage—utilization of talent and

- ♦ professional expertise, and expansion of market access—become more pronounced.
- ♦ Revenue <¥50M. Early-stage foundational work, exploration, and learning tend to move to the foreground.
- ♦ Revenue ≥¥50M. Channel optimization, the sophistication of finance and human resources, and implementation through collaboration become central.

Note. Representative item lists and the mapping from items to factor names are organized in Appendix Tables A1–A5. An overview of the five EFA solutions appears in Table 3. Also note that the factors labeled Public Support (PS) and Implementation Execution (IE) tend to be reproduced at the label level, whereas overlap in adopted items is limited. Accordingly, subsequent cross-sectional comparisons proceed by labels (PS/IE) rather than by factor numbers; F3 is treated as a context-dependent component.

4.2 Item Removal Criteria and Interpretation of Results

We examined the validity of the factor composition and determined adoption/removal based on the following criteria:

- (1) Items with $|\text{loading}| < .40$ were not adopted.
- (2) For cross-loadings ($\geq .30$), we judged removal or retention by considering theoretical validity (placement within the EC model), semantic proximity of content, and cross-group consistency.
- (3) Comparisons were made on the basis of labels. While aligning subgroup solutions to the corresponding labels in the Full solution, adoption/removal within each subgroup was decided with reference to (i) $|\text{loading}| \geq .40$, (ii) suppression of cross-loadings, and (iii) theoretical coherence.

4.3 Initial Reliability Assessment

We computed internal consistency (Cronbach's α) for each factor, using $\alpha \geq .70$ as a practical benchmark. Group wise α values are tabulated in Appendix Table A6. Overall, the Full solution meets the practical benchmark ($\alpha \geq .70$), and the employee based split does not show marked deterioration. These results provide grounds for anticipating measurement invariance in subsequent CFA (with potential partial invariance via limited parameter freeing).

4.4 Group Comparison: Employee Size (1–5 vs. ≥6)

We compared item set overlap (Jaccard) and the mean $|\Delta\text{loading}|$ across common items. PS represents the activation of institutions, support schemes, and external networks, while IE represents the capability to execute implementation/operation/improvement. Factor numbers vary by group and high item overlap appears only in some cases; by contrast, F3 is strongly context dependent—grassroots/basic operations are foregrounded for 1–5 employees, whereas professionalization and market access are foregrounded for ≥6 employees.

The mean $|\Delta\text{loading}| \approx 0.137$, indicating small to moderate variation in loading magnitudes even for identical items.

Interpretation. The variable factor F3 tends to emphasize basic routines and grassroots networks in the 1–5 group, and talent/professional expertise and market access in the ≥6 group; this induces frequent reconfiguration of item composition.

4.5 Group Comparison: Revenue (<¥50M vs. ≥¥50M)

Using the same indices as above, the revenue split exhibits larger differences: mean Jaccard = 0.193 and mean $|\Delta\text{loading}| \approx 0.150$.

Because Jaccard = 0.193 is low, non-overlap is pronounced, especially for F3. *Interpretation:* In the <¥50M group, psychological capital, exploration/learning, and initial use of public support tend to crystallize as the core; in the ≥¥50M group, channel optimization, the sophistication of finance and human resources, and collaborative implementation become core. Note: PS/IE are reproduced at the label level, but many group pairs do not reach the thresholds for Jaccard or Tucker's ϕ .

4.6 Consistency with the Full Solution (Tucker's Congruence ϕ)

Each group's factors were Procrustes-aligned to the corresponding factors in the Full solution, and Tucker's ϕ was computed over common items.

- ♦ emp_1_5 vs. Full: $\phi = 0.998$ (near-perfect agreement)
- ♦ emp_6p vs. Full: $\phi = 0.976$ (high agreement)
- ♦ rev_<¥50M vs. Full: $\phi = 0.900$ (relatively weaker consistency)
- ♦ rev_≥¥50M vs. Full: $\phi = 0.982$ (high agreement)

Interpretation. The Full solution approximates a “weighted-average portrait” of the employee-size split, yet its centroid tends to shift away from the lower-revenue group (<¥50M). A single, Full-sample-based model therefore risks under-fitting the low-revenue group. ϕ is not computed where there are no common adopted items; reported values are limited to computable pairs.

5 Discussion

5.1 Theoretical Implications

The multigroup EFA shows that while Public Support (PS) and Innovation Execution (IE) are “repeated as labels,” the sets of adopted items are reconfigured depending on context. The revenue split ... highlights larger cross group movement of items and suggests that what is being reproduced is the functional role (label level construct), not a fixed inventory of items. This finding also implies that factor comparisons should be anchored to semantic labels rather than factor numbers. In addition, the context dependent factor (F3) frequently changes its item composition across groups, indicating that the surrounding structure adjusts with the stage and scale. Taken together, these results suggest a model in which a common core coexists with a stage dependent periphery. Note that H1 receives only partial support because there were situations in which Drive and Purpose emerged as an integrated factor rather than as clearly separated components.

5.2 Practical Implications

The results clarify focal points for support design and resource allocation. In the < ¥50M group, motivation, exploration/learning, and initial use of public support are relatively strong, whereas bridges to market access and resource mobilization are more likely to become bottlenecks. In the ≥ ¥50M group, channel optimization, the advancement of finance and human resources, and collaborative implementation crystallize as the core.

For practical operations, PS/IE should be visualized as standard domains (labels) while avoiding a rigid, fixed checklist. Emphasize a minimal core (e.g., compliance ... basic internal controls) plus context modules that are switched on/off according to stage. For the IE

domain, anchor routines in metrics such as *CAC* (*Customer Acquisition Cost*), channel ROI, and gross profit per labor cost, focusing on efficiency and repeatability.

5.3 Reflection on the Number of Factors

In this study, although free-exploration criteria such as parallel analysis and MAP dispersed the recommended factor count between six and nine, we prioritized commensurate dimensionality for multigroup comparison and thus fixed the number of factors at five. This design choice improves comparability yet may compress finer-grained substructures (e.g., potential splits within external-factor blocks). Going forward, we will quantify the range of variability through multigroup CFA (allowing partial invariance as needed) and sensitivity analyses on alternative factor counts, rotations, and loading thresholds.

At the same time, fixing the model at five factors made the variability of F3 stand out in a contrasting manner, which was useful for distinguishing the “core” from the “peripheral” components of between-group differences. The Full solution functioned as a weighted-average portrait, but its centroid tended to shift away from the lower-revenue group (< ¥50M), implying the risk of under-fitting if only the Full model is used. In sum, while five-factor fixing is reasonable as a basis for comparison, a multi-track evaluation—including re-optimizing the number of factors at the theory-refinement stage—appears necessary.

5.4 Responses to Hypotheses (H1–H5)

In this subsection, we summarize the findings relevant to the hypotheses presented in Section 2.3 (evidence: Sections 4.1–4.6).

- ♦ **H1 (Replicability of Drive and Purpose).** *Partially supported.* In several groups, Drive and Purpose emerge as an integrated factor rather than fully separated components, limiting full replication of a clean split (Sections 4.1, 4.4).
- ♦ **H2 (Differentiation hypothesis: EE).** *Supported.* Smaller organizations (< employees or revenue) tend to show a more unified EE factor, whereas larger organizations exhibit differentiation between market access and implementation infrastructure (Sections 4.1, 4.4, 4.5).
- ♦ **H3 (Availability–Usage bifurcation).** *Supported.* With increased organizational scale, perceived availability and actual usage of EE resources separate more clearly (Sections 4.4–4.5).
- ♦ **H4 (Bridge hypothesis: Readiness).** *Partially supported.* Readiness tends to sit closer to internal factors in smaller organizations, and closer to EE (especially implementation infrastructure) or shows cross-loadings in larger organizations (Sections 4.1, 4.4).
- ♦ **H5 (Interfactor correlations).** *Supported with qualifications.* As scale increases, correlations between EE and Drive/Purpose adjust toward weak-to-moderate levels, indicating clearer functional division; overly high correlations would imply under-differentiation (Sections 4.1, 4.4–4.6).
- ♦ *Note.* For cross-group alignment and interpretation, we anchor on **labels** (PS/IE/etc.) rather than factor numbers (Sections 3.4, 4.1).

Summary. Within our framework, the unit of reproducibility is the label (PS/IE), not the factor number, and the universality of the item sets is limited. This indicates that the core for each label should be kept minimal and that peripheral items ought to be swapped according to stage and scale. These findings align with an operational design based on a common core

+ context modules (see 5.2).

6 Limitations and Future Directions

This study has several limitations and directions for future research. First, the study employs a cross-sectional design. Whether the structural differences observed as group differences actually reflect, over time, transitions across developmental stages (exploration → implementation → scale) should be examined using longitudinal or panel data with repeated measurements at the firm level.

Second, analytic decisions—such as the item adoption criteria ($|\text{loading}| \geq .40$), the handling of cross-loadings, the rotation method, and any smoothing of the correlation matrix—can affect the Jaccard index, $|\Delta\text{loading}|$, and Tucker's congruence coefficient (ϕ). Especially when the adopted item sets differ across groups, Procrustes alignment and the interpretation of ϕ depend on the common item set; therefore, explicit reporting of the common core items and sensitivity analyses on thresholds are important to enhance reproducibility and interpretability.

Third, although reliability generally met practical levels, some factors in the < ¥50M revenue group showed relatively lower Cronbach's α , suggesting that improving item homogeneity (e.g., consolidating redundant items and clarifying wording) would be beneficial. In particular, Factor 4 showed non-positive Cronbach's α across groups, indicating that internal consistency is not supported and that item coding and content homogeneity should be revisited in future scale refinement. Relatedly, when only a small number of items are commonly adopted across groups, ϕ can become less stable; thus, clarifying the common core items remains essential.

Fourth, the generalizability of the findings may be constrained by sample composition. The sample exhibits a substantial gender imbalance (95.9% male; Table 1), which may limit the extent to which the extracted entrepreneurial characteristics and their group differences generalize to female entrepreneurs. In addition, the distribution of firm size and revenue is skewed toward smaller and lower-revenue firms (e.g., ≤ 5 employees account for 76.0% of the sample and < ¥50M revenue accounts for 65.1%; Table 1). As a result, overall patterns may be disproportionately influenced by micro and early-stage firms, while larger or higher-revenue firms may be underrepresented. Differences in group sizes may also affect the stability of factor solutions and similarity metrics across groups.

Going forward, we plan to (i) expand data collection to include a larger and more balanced sample of female entrepreneurs and conduct stratified analyses by gender, and (ii) incorporate explicit development-stage variables (e.g., firm age, financing stage, and scaling milestones) as stratification factors and/or covariates to disentangle size/revenue effects from lifecycle effects and mitigate compositional bias. Methodologically, in addition to testing partial invariance models via multigroup CFA, it would be useful to examine mediating and moderating relationships using SEM (e.g., psychological capital → market access → outcomes) and to evaluate predictive validity against external criteria (sales growth, employment, financing). We also aim to improve the reproducibility of the conclusions by verifying results with a replication sample and enhancing transparency in analysis planning through preregistration.

7 Conclusion

This study used multigroup EFA with the factor count fixed at five and showed that, although Public Support (PS) and Innovation Execution (IE) are repeated across groups at the level of labels, the universality of the adopted item sets is limited. Accordingly, assuming label level repetition \times situational variability (F3), an operational design that combines a common core with context modules is effective.

Second, the domain corresponding to F3 is highly context dependent: the nucleus of items and the weight of factor loadings tend to be reshuffled as employee size and revenue level change. In addition, the Full sample solution functions as a weighted average portrait of the employee split yet tends to diverge from the lower revenue group. This suggests that progress in business scale—market access and resource mobilization—can shape the latent structure.

From a measurement standpoint, fixing the number of factors at five ensured commensurate dimensionality for comparison, but it may compress group specific substructures. Going forward, we will refine validity through multigroup CFA (allowing partial invariance as needed), sensitivity analyses on thresholds and modeling choices, and SEM to examine mediating and moderating relationships, thereby sharpening predictive validity against external criteria.

Overall, this study makes visible a duality between universal implementation processes and context dependent exploration and resource integration, and it provides a foundation for subsequent theory testing—premised on intervention design tailored to group characteristics and on partial measurement invariance.

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Appendix

Table A1: The summary of the results -Full

#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q11_6	Have you applied your expertise or technical skills in the business?	0.970	-0.339	0.079	0.057	-0.018	Skillset
Q11_7	Have you listened to others' views and communicated your own carefully to facilitate smooth communication with customers or employees?	0.968	-0.216	0.051	0.096	-0.028	Skillset
Q11_3	Have you devised and implemented solutions to challenges yourself?	0.945	-0.229	0.051	0.041	-0.018	Skillset
Q12_4	Do you feel a strong drive to accomplish things on your own?	0.731	-0.026	0.062	0.008	0.031	Mindset
Q11_8	Have you prioritized and made trade-offs under resource constraints?	0.716	0.039	-0.031	-0.035	-0.053	Skillset
Q11_9	Have you made business decisions considering legal and accounting frameworks?	0.715	-0.024	0.024	0.034	0.018	Skillset
Q11_1	Have you proactively learned new skills or knowledge?	0.702	-0.135	0.018	-0.126	0.013	Skillset
Q11_4	Have you led a team or stakeholders to achieve goals?	0.668	0.115	-0.069	0.005	0.044	Skillset
Q12_6	Do you have the will to keep challenging yourself without giving up, even in difficult situations?	0.656	0.002	0.066	-0.026	0.048	Mindset
Q12_2	Do you value long-term growth over short-term results?	0.636	-0.071	0.119	-0.017	-0.037	Mindset
Q11_5	Have you made strategic decisions based on market and competitor information?	0.615	0.052	-0.076	-0.133	0.071	Skillset
Q12_1	Do you view failures as learning opportunities and remain proactive about new challenges?	0.601	0.120	-0.067	-0.060	-0.023	Mindset
Q12_8	Do you want to contribute to society or your community through entrepreneurship?	0.507	0.073	0.152	-0.083	0.008	Mindset
Q12_7	Do you want to generate creative ideas that no one has realized before?	0.430	0.190	0.033	-0.197	0.048	Mindset
Q11_11	Do you routinely seek new business ideas and turn them into business opportunities?	0.408	0.347	-0.098	-0.141	0.089	Skillset
#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q14_6	In school or at home, was entrepreneurship discussed as a possible career path?	-0.203	0.788	0.098	0.133	0.000	Cultural Factors
Q15_1	Have you utilized government or municipal entrepreneurship support programs?	-0.419	0.767	0.190	-0.088	-0.026	Infrastructure Factors
Q15_3	Have you leveraged local universities or research institutions?	-0.397	0.737	0.138	-0.149	-0.002	Infrastructure Factors
Q14_8	Do you feel Japan has a culture that respects entrepreneurs?	-0.112	0.606	0.343	0.181	-0.034	Cultural Factors
Q13_3	Do you think you are able to secure necessary financing (e.g., bank loans, angel investors, VCs)?	0.153	0.594	-0.005	0.208	-0.048	Business Resources
Q13_1	Do you think you are able to hire talent with the skills needed for the business?	0.145	0.559	-0.045	0.047	-0.030	Business Resources
Q14_2	Do you have family or acquaintances who inspired you to pursue entrepreneurship?	0.060	0.544	0.007	0.083	-0.014	Cultural Factors
Q11_12	Have you conceived a novel business not yet in the market and examined its feasibility?	0.021	0.534	-0.156	-0.304	0.101	Skillset
Q14_4	Do you feel Japan has a culture that tolerates failure and connects it to the next challenge?	0.084	0.524	0.183	0.227	-0.031	Cultural Factors
Q11_10	Have you secured external financing based on a business plan you prepared?	-0.019	0.518	-0.032	-0.084	0.095	Skillset
Q14_1	Do you have a mentor-like person who listens and gives advice for solving business issues?	0.166	0.499	0.020	-0.048	0.003	Cultural Factors
Q13_5	Do you think you effectively leverage external experts (e.g., lawyers, accountants, consultants)?	0.245	0.464	-0.017	0.122	-0.024	Business Resources
Q12_5	When you spot a new business opportunity, do you feel compelled to act quickly?	0.180	0.449	-0.065	-0.179	-0.023	Mindset
Q14_7	Do you feel startup competitions improve society's overall awareness of entrepreneurship?	0.086	0.427	0.381	0.032	0.040	Cultural Factors
#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q15_8	Do you think pro-entrepreneurship policies raise society's overall entrepreneurial mindset?	0.038	0.120	0.822	-0.057	0.000	Infrastructure Factors
Q15_7	Do you think publicizing government success cases raises entrepreneurs' motivation?	0.018	0.149	0.809	-0.050	0.051	Infrastructure Factors
Q15_6	Do you think governmental/legal systems and deregulation are effective for entrepreneurship and business development?	0.157	-0.027	0.766	-0.120	0.004	Infrastructure Factors
Q15_2	Do you think such government or municipal programs are effective for starting up and business development?	0.088	0.113	0.647	-0.068	-0.019	Infrastructure Factors
Q15_4	Do you think local universities and research institutions are effective for entrepreneurship and business development?	0.132	0.052	0.605	-0.123	0.021	Infrastructure Factors
#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q10[1]	Developed new products/services based on market needs	-0.037	-0.063	0.095	0.606	-0.069	Skillset
Q10[2]	Pivoted business direction to improve sales or growth	-0.029	0.052	0.042	0.558	-0.118	Skillset
Q10[4]	Proactively adopted new technologies or methods	-0.095	0.133	-0.016	0.499	-0.041	Skillset
Q10[5]	Challenged collaboration with other firms/industries or overseas expansion	0.030	0.070	-0.087	0.462	-0.005	Skillset
Q10[3]	Founded the business to address a social issue	-0.011	0.049	-0.041	0.458	-0.028	Skillset
Q09[1]	Business expansion	-0.079	-0.022	-0.028	0.421	0.109	Skillset
Q09[2]	Launch of a new business	0.023	-0.014	-0.037	0.412	0.037	Skillset

Table A2: The summary of the results - emp_1_5

#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q11_6	Have you applied your expertise or technical skills in the business?	0.955	-0.350	0.061	0.059	0.010	Skillset
Q11_7	Have you listened to others' views and communicated your own carefully to facilitate smooth communication with customers or employees?	0.945	-0.209	0.038	0.075	-0.020	Skillset
Q11_3	Have you devised and implemented solutions to challenges yourself?	0.935	-0.197	0.035	0.062	-0.025	Skillset
Q11_8	Have you prioritized and made trade-offs under resource constraints?	0.715	0.081	-0.040	0.003	-0.058	Skillset
Q11_9	Have you made business decisions considering legal and accounting frameworks?	0.698	0.001	-0.035	0.087	0.002	Skillset
Q11_1	Have you proactively learned new skills or knowledge?	0.691	-0.074	-0.037	-0.083	0.004	Skillset
Q12_4	Do you feel a strong drive to accomplish things on your own?	0.645	-0.004	0.055	-0.035	0.040	Mindset
Q11_4	Have you led a team or stakeholders to achieve goals?	0.613	0.185	-0.109	0.040	0.043	Skillset
Q12_6	Do you have the will to keep challenging yourself without giving up, even in difficult situations?	0.584	-0.008	0.055	-0.078	0.028	Mindset
Q12_1	Do you view failures as learning opportunities and remain proactive about new challenges?	0.550	0.166	-0.095	-0.062	-0.065	Mindset
Q11_5	Have you made strategic decisions based on market and competitor information?	0.546	0.146	-0.107	-0.104	0.074	Skillset

Q12_2	Do you value long-term growth over short-term results?	0.539	-0.074	0.117	-0.072	-0.026	Mindset
Q12_8	Do you want to contribute to society or your community through entrepreneurship?	0.435	0.116	0.100	-0.130	-0.016	Mindset
#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q15_1	Have you utilized government or municipal entrepreneurship support programs?	-0.411	0.757	0.183	-0.021	-0.034	Infrastructure Factors
Q14_6	In school or at home, was entrepreneurship discussed as a possible career path?	-0.155	0.710	0.097	0.149	-0.001	Cultural Factors
Q15_3	Have you leveraged local universities or research institutions?	-0.374	0.686	0.197	-0.062	-0.025	Infrastructure Factors
Q11_12	Have you conceived a novel business not yet in the market and examined its feasibility?	-0.010	0.645	-0.168	-0.270	0.061	Skillset
Q11_10	Have you secured external financing based on a business plan you prepared?	0.027	0.544	-0.017	0.032	0.078	Skillset
Q13_1	Do you think you are able to hire talent with the skills needed for the business?	0.136	0.537	-0.042	0.081	-0.055	Business Resources
Q13_3	Do you think you are able to secure necessary financing (e.g., bank loans, angel investors, VCs)?	0.137	0.525	0.033	0.250	-0.043	Business Resources
Q12_5	When you spot a new business opportunity, do you feel compelled to act quickly?	0.137	0.511	-0.073	-0.221	-0.045	Mindset
Q14_2	Do you have family or acquaintances who inspired you to pursue entrepreneurship?	0.038	0.466	0.068	0.046	-0.002	Cultural Factors
Q14_1	Do you have a mentor-like person who listens and gives advice for solving business issues?	0.155	0.465	0.075	-0.036	0.000	Cultural Factors
Q11_11	Do you routinely seek new business ideas and turn them into business opportunities?	0.351	0.460	-0.098	-0.122	0.078	Skillset
Q11_2	Have you used digital tools (e.g., social media, web ads) to acquire and retain customers?	-0.019	0.448	-0.042	-0.163	0.029	Skillset
Q13_5	Do you think you effectively leverage external experts (e.g., lawyers, accountants, consultants)?	0.221	0.404	0.005	0.148	-0.045	Business Resources
#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q15_8	Do you think pro-entrepreneurship policies raise society's overall entrepreneurial mindset?	0.011	0.078	0.863	-0.102	0.046	Infrastructure Factors
Q15_7	Do you think publicizing government success cases raises entrepreneurs' motivation?	-0.030	0.103	0.862	-0.098	0.092	Infrastructure Factors
Q15_6	Do you think governmental/legal systems and deregulation are effective for entrepreneurship and business development?	0.110	-0.046	0.783	-0.174	0.038	Infrastructure Factors
Q15_2	Do you think such government or municipal programs are effective for starting up and business development?	0.071	0.061	0.692	-0.111	0.026	Infrastructure Factors
Q15_4	Do you think local universities and research institutions are effective for entrepreneurship and business development?	0.075	0.057	0.617	-0.142	0.052	Infrastructure Factors
Q14_5	Do you feel entrepreneurs' activities and challenges are often reported positively in TV, newspapers, and social media?	0.148	0.287	0.406	0.048	0.045	Cultural Factors
#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q10[1]	Developed new products/services based on market needs	-0.063	-0.086	0.003	0.592	-0.018	Skillset
Q10[2]	Pivoted business direction to improve sales or growth	-0.045	0.083	-0.025	0.523	-0.100	Skillset
Q10[4]	Proactively adopted new technologies or methods	-0.107	0.079	-0.004	0.451	-0.067	Skillset
Q10[3]	Founded the business to address a social issue	-0.020	0.017	-0.012	0.423	-0.006	Skillset
Q09[1]	Business expansion	-0.106	0.014	-0.113	0.415	0.151	Skillset

Table A3: The summary of the results - emp_6

v	Item	F1	F2	F3	F4	F5	Factor Attributes
Q11_7	Have you listened to others' views and communicated your own carefully to facilitate smooth communication with customers or employees?	0.885	-0.261	0.123	0.165	-0.048	Skillset
Q11_4	Have you led a team or stakeholders to achieve goals?	0.882	-0.166	-0.017	0.013	-0.038	Skillset
Q12_4	Do you feel a strong drive to accomplish things on your own?	0.871	-0.062	0.098	0.088	-0.042	Mindset
Q11_3	Have you devised and implemented solutions to challenges yourself?	0.870	-0.307	-0.120	-0.003	0.006	Skillset
Q11_6	Have you applied your expertise or technical skills in the business?	0.866	-0.279	-0.004	0.091	-0.106	Skillset
Q11_5	Have you made strategic decisions based on market and competitor information?	0.838	-0.191	-0.129	0.027	0.018	Skillset
Q12_6	Do you have the will to keep challenging yourself without giving up, even in difficult situations?	0.811	0.115	0.128	0.064	0.140	Mindset
Q12_1	Do you view failures as learning opportunities and remain proactive about new challenges?	0.740	-0.073	-0.112	-0.003	0.074	Mindset
Q12_2	Do you value long-term growth over short-term results?	0.736	-0.051	0.128	0.231	-0.083	Mindset
Q11_9	Have you made business decisions considering legal and accounting frameworks?	0.729	-0.032	-0.027	0.115	0.032	Skillset
Q11_11	Do you routinely seek new business ideas and turn them into business opportunities?	0.727	-0.028	-0.180	-0.177	0.076	Skillset
Q11_8	Have you prioritized and made trade-offs under resource constraints?	0.703	-0.238	-0.270	0.005	-0.106	Skillset
Q11_1	Have you proactively learned new skills or knowledge?	0.672	-0.088	-0.228	-0.076	0.055	Skillset
Q12_7	Do you want to generate creative ideas that no one has realized before?	0.653	0.206	-0.021	-0.073	0.062	Mindset
Q12_8	Do you want to contribute to society or your community through entrepreneurship?	0.587	0.313	0.154	0.068	0.101	Mindset
Q13_2	Do you think your firm's technology or products/services have differentiating strengths?	0.537	0.075	-0.025	0.341	0.015	Business Resources
Q14_3	Do you feel that understanding and support from family and friends positively affect your entrepreneurial intentions?	0.533	0.029	-0.026	0.172	-0.001	Cultural Factors
Q12_3	Are you inclined to take on new, risk-bearing challenges willingly?	0.494	0.190	-0.047	-0.051	0.029	Mindset
Q12_5	When you spot a new business opportunity, do you feel compelled to act quickly?	0.488	0.304	-0.035	-0.226	0.038	Mindset
#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q15_7	Do you think publicizing government success cases raises entrepreneurs' motivation?	-0.089	1.006	0.125	-0.014	0.091	Infrastructure Factors
Q15_8	Do you think pro-entrepreneurship policies raise society's overall entrepreneurial mindset?	-0.180	0.990	0.110	0.041	-0.018	Infrastructure Factors
Q15_6	Do you think governmental/legal systems and deregulation are effective for entrepreneurship and business development?	-0.009	0.894	0.107	-0.034	0.050	Infrastructure Factors
Q15_5	Have you taken advantage of governmental/legal systems or deregulation?	-0.081	0.889	-0.036	-0.046	-0.001	Infrastructure Factors
Q14_8	Do you feel Japan has a culture that respects entrepreneurs?	-0.110	0.836	0.112	0.132	-0.020	Cultural Factors
Q15_1	Have you utilized government or municipal entrepreneurship support programs?	-0.300	0.798	-0.262	-0.035	0.040	Infrastructure Factors

Q15_2	Do you think such government or municipal programs are effective for starting up and business development?	-0.139	0.769	0.023	0.163	-0.039	Infrastructure Factors
Q14_6	In school or at home, was entrepreneurship discussed as a possible career path?	-0.210	0.752	-0.058	0.168	0.068	Cultural Factors
Q15_4	Do you think local universities and research institutions are effective for entrepreneurship and business development?	0.053	0.704	0.063	0.064	-0.002	Infrastructure Factors
Q14_7	Do you feel startup competitions improve society's overall awareness of entrepreneurship?	0.130	0.642	0.061	0.119	0.016	Cultural Factors
Q15_3	Have you leveraged local universities or research institutions?	-0.272	0.629	-0.370	0.026	0.081	Infrastructure Factors
Q14_4	Do you feel Japan has a culture that tolerates failure and connects it to the next challenge?	0.125	0.537	0.093	0.117	0.057	Cultural Factors
Q14_5	Do you feel entrepreneurs' activities and challenges are often reported positively in TV, newspapers, and social media?	0.232	0.440	-0.009	-0.020	-0.053	Cultural Factors
#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q10[1]	Developed new products/services based on market needs	-0.064	0.169	0.710	-0.081	-0.194	Skillset
Q10[2]	Pivoted business direction to improve sales or growth	-0.092	0.092	0.569	-0.055	-0.130	Skillset
Q10[4]	Proactively adopted new technologies or methods	-0.068	0.037	0.445	-0.007	0.097	Skillset
Q09[1]	Business expansion	0.005	0.091	0.442	-0.177	0.006	Skillset
Q10[5]	Challenged collaboration with other firms/industries or overseas expansion	-0.102	-0.023	0.420	0.156	0.114	Skillset
Q10[3]	Founded the business to address a social issue	0.001	-0.115	0.407	0.033	0.048	Skillset
#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q13_3	Do you think you are able to secure necessary financing (e.g., bank loans, angel investors, VCs)?	0.099	0.141	-0.051	0.629	-0.101	Business Resources
Q13_1	Do you think you are able to hire talent with the skills needed for the business?	0.096	0.189	-0.113	0.595	0.004	Business Resources
Q13_4	Do you think you are able to acquire necessary customers and sales channels?	0.296	0.097	-0.109	0.571	0.001	Business Resources
Q13_5	Do you think you effectively leverage external experts (e.g., lawyers, accountants, consultants)?	0.262	0.135	-0.100	0.433	0.013	Business Resources

Table A4: The summary of the results - rev_<¥50M

#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q11_7	Have you applied your expertise or technical skills in the business?	0.955	-0.199	0.051	0.102	-0.038	Skillset
Q11_6	Have you made strategic decisions based on market and competitor information?	0.931	-0.324	0.086	0.056	0.005	Skillset
Q11_3	Have you used digital tools (e.g., social media, web ads) to acquire and retain customers?	0.923	-0.161	0.039	0.060	-0.046	Skillset
Q11_9	Have you prioritized and made trade-offs under resource constraints?	0.711	-0.038	0.042	0.086	0.012	Skillset
Q11_8	Have you listened to others' views and communicated your own carefully to facilitate smooth communication with customers or employees?	0.709	0.081	-0.013	0.009	-0.079	Skillset
Q11_1	None of the above	0.699	-0.103	-0.006	-0.083	-0.011	Skillset
Q11_4	Have you devised and implemented solutions to challenges yourself?	0.640	0.157	-0.115	0.042	0.017	Skillset
Q12_4	Are you inclined to take on new, risk-bearing challenges willingly?	0.617	0.046	0.069	-0.071	0.035	Mindset
Q12_6	When you spot a new business opportunity, do you feel compelled to act quickly?	0.545	0.024	0.059	-0.098	0.045	Mindset
Q11_5	Have you led a team or stakeholders to achieve goals?	0.530	0.107	-0.123	-0.110	0.073	Skillset
Q12_1	Have you conceived a novel business not yet in the market and examined its feasibility?	0.498	0.188	-0.089	-0.085	-0.049	Skillset
Q12_8	Do you want to generate creative ideas that no one has realized before?	0.489	0.103	0.059	-0.113	-0.040	Mindset
Q12_2	Do you view failures as learning opportunities and remain proactive about new challenges?	0.467	-0.054	0.104	-0.076	-0.028	Mindset
#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q15_1	Do you feel Japan has a culture that respects entrepreneurs?	-0.407	0.793	0.134	-0.035	-0.032	Cultural Factors
Q14_6	Do you feel entrepreneurs' activities and challenges are often reported positively in TV, newspapers, and social media?	-0.213	0.731	0.077	0.115	0.026	Cultural Factors
Q15_3	Do you think such government or municipal programs are effective for starting up and business development?	-0.353	0.672	0.165	-0.121	-0.019	Infrastructure Factors
Q13_3	Do you think your firm's technology or products/services have differentiating strengths?	0.078	0.615	-0.031	0.236	-0.056	Business Resources
Q13_1	Do you want to contribute to society or your community through entrepreneurship?	0.089	0.598	-0.083	0.068	-0.066	Mindset
Q11_12	Do you routinely seek new business ideas and turn them into business opportunities?	0.013	0.546	-0.126	-0.317	0.101	Skillset
Q12_5	Do you feel a strong drive to accomplish things on your own?	0.064	0.527	-0.089	-0.218	-0.018	Mindset
Q11_10	Have you made business decisions considering legal and accounting frameworks?	-0.019	0.526	-0.071	0.002	0.113	Skillset
Q13_5	Do you think you are able to acquire necessary customers and sales channels?	0.137	0.515	0.024	0.075	-0.039	Business Resources
Q14_4	Do you feel that understanding and support from family and friends positively affect your entrepreneurial intentions?	0.086	0.482	0.250	0.275	-0.021	Cultural Factors
Q14_1	Do you think you effectively leverage external experts (e.g., lawyers, accountants, consultants)?	0.140	0.469	0.033	-0.029	-0.037	Business Resources
Q13_4	Do you think you are able to secure necessary financing (e.g., bank loans, angel investors, VCs)?	0.309	0.469	-0.010	0.189	-0.083	Business Resources
Q14_2	Do you have a mentor-like person who listens and gives advice for solving business issues?	0.062	0.462	0.036	0.048	0.004	Cultural Factors
Q11_2	Have you proactively learned new skills or knowledge?	0.012	0.431	-0.063	-0.148	-0.016	Skillset
#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q15_7	Do you think governmental/legal systems and deregulation are effective for entrepreneurship and business development?	0.017	0.211	0.792	-0.014	0.046	Infrastructure Factors
Q15_8	Do you think publicizing government success cases raises entrepreneurs' motivation?	0.030	0.208	0.776	-0.012	-0.031	Infrastructure Factors
Q15_6	Have you taken advantage of governmental/legal systems or deregulation?	0.077	0.064	0.713	-0.141	0.015	Infrastructure Factors
Q15_2	Have you utilized government or municipal entrepreneurship support programs?	0.044	0.201	0.617	-0.061	-0.032	Infrastructure Factors
Q15_4	Have you leveraged local universities or research institutions?	0.125	0.098	0.587	-0.151	0.033	Infrastructure Factors
#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q09[7]	Other	-0.032	-0.050	-0.019	0.629	-0.069	Skillset
Q10[2]	Developed new products/services based on market needs	-0.068	0.149	-0.016	0.523	-0.120	Skillset
Q10[4]	Founded the business to address a social issue	-0.082	0.141	-0.027	0.492	-0.042	Skillset

Q09[1]	Business expansion	-0.036	0.018	-0.028	0.411	0.191	Skillset
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Table A5: The summary of the results - rev_>=¥50M

#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q11_7	Have you listened to others' views and communicated your own carefully to facilitate smooth communication with customers or employees?	0.956	-0.251	0.054	-0.035	0.026	Skillset
Q11_6	Have you applied your expertise or technical skills in the business?	0.951	-0.314	0.003	-0.062	0.059	Skillset
Q11_3	Have you devised and implemented solutions to challenges yourself?	0.902	-0.284	-0.052	0.026	0.017	Skillset
Q12_4	Do you feel a strong drive to accomplish things on your own?	0.867	-0.104	0.125	-0.041	0.027	Mindset
Q12_2	Do you value long-term growth over short-term results?	0.866	-0.034	0.070	-0.064	0.113	Mindset
Q12_6	Do you have the will to keep challenging yourself without giving up, even in difficult situations?	0.795	0.006	0.110	0.030	-0.011	Mindset
Q11_5	Have you made strategic decisions based on market and competitor information?	0.789	-0.139	-0.158	0.058	-0.010	Skillset
Q12_1	Do you view failures as learning opportunities and remain proactive about new challenges?	0.760	-0.107	-0.044	-0.004	-0.038	Mindset
Q11_4	Have you led a team or stakeholders to achieve goals?	0.748	-0.078	-0.071	0.051	-0.025	Skillset
Q11_9	Have you made business decisions considering legal and accounting frameworks?	0.729	-0.103	-0.044	-0.021	-0.092	Skillset
Q11_8	Have you prioritized and made trade-offs under resource constraints?	0.728	-0.183	-0.187	-0.047	-0.098	Skillset
Q11_1	Have you proactively learned new skills or knowledge?	0.638	-0.146	-0.244	0.060	-0.057	Skillset
Q13_2	Do you think your firm's technology or products/services have differentiating strengths?	0.620	0.178	0.036	0.028	0.043	Business Resources
Q13_4	Do you think you are able to acquire necessary customers and sales channels?	0.603	0.178	0.065	-0.028	0.098	Business Resources
Q14_3	Do you feel that understanding and support from family and friends positively affect your entrepreneurial intentions?	0.573	0.153	0.084	-0.060	0.024	Cultural Factors
Q12_7	Do you want to generate creative ideas that no one has realized before?	0.569	0.165	-0.103	0.049	-0.137	Mindset
Q11_11	Do you routinely seek new business ideas and turn them into business opportunities?	0.526	0.083	-0.161	0.058	-0.190	Skillset
Q12_8	Do you want to contribute to society or your community through entrepreneurship?	0.510	0.282	0.007	0.075	0.116	Mindset
Q13_5	Do you think you effectively leverage external experts (e.g., lawyers, accountants, consultants)?	0.492	0.147	0.171	0.031	-0.019	Business Resources
Q12_3	Are you inclined to take on new, risk-bearing challenges willingly?	0.439	0.106	-0.082	-0.040	-0.133	Mindset
#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q14_8	Do you feel Japan has a culture that respects entrepreneurs?	-0.145	0.926	0.175	-0.037	-0.008	Cultural Factors
Q15_5	Have you taken advantage of governmental/legal systems or deregulation?	-0.146	0.896	-0.084	-0.011	0.148	Infrastructure Factors
Q15_1	Have you utilized government or municipal entrepreneurship support programs?	-0.372	0.866	-0.148	-0.003	-0.039	Infrastructure Factors
Q14_6	In school or at home, was entrepreneurship discussed as a possible career path?	-0.083	0.816	0.180	-0.040	-0.162	Cultural Factors
Q15_3	Have you leveraged local universities or research institutions?	-0.354	0.793	-0.132	0.004	-0.174	Infrastructure Factors
Q14_7	Do you feel startup competitions improve society's overall awareness of entrepreneurship?	0.111	0.746	0.045	-0.009	0.088	Cultural Factors
Q14_5	Do you feel entrepreneurs' activities and challenges are often reported positively in TV, newspapers, and social media?	0.169	0.578	0.126	-0.062	-0.043	Cultural Factors
Q14_4	Do you feel Japan has a culture that tolerates failure and connects it to the next challenge?	0.144	0.529	0.204	-0.045	-0.160	Cultural Factors
Q14_2	Do you have family or acquaintances who inspired you to pursue entrepreneurship?	0.151	0.476	0.120	-0.039	-0.160	Cultural Factors
#	Item	F1	F2	F3	F4	F5	Factor Attributes
Q10[5]	Challenged collaboration with other firms/industries or overseas expansion	0.101	0.007	0.626	0.017	-0.047	Skillset
Q10[1]	Developed new products/services based on market needs	-0.096	0.136	0.544	-0.041	0.172	Skillset
Q10[2]	Pivoted business direction to improve sales or growth	-0.024	0.056	0.522	-0.095	0.129	Skillset
Q10[4]	Proactively adopted new technologies or methods	-0.084	0.084	0.505	-0.024	-0.016	Skillset
Q10[3]	Founded the business to address a social issue	0.043	-0.156	0.501	0.002	-0.069	Skillset
Q09[2]	Launch of a new business	0.011	-0.065	0.422	0.045	-0.081	Skillset

Table A6: Group-wise Cronbach's α by Employee Size and Annual Revenue

scale_name	n_items	full_P [n=459]	emp_1_5_P [n=459]	emp_6p_P [n=145]	rev_<50M_P [n=393]	rev_>=50M_P [n=211]
F1	13	0.93	0.92	0.95	0.91	0.94
F2	9	0.82	0.81	0.82	0.8	0.82
F3	5	0.9	0.89	0.92	0.89	0.92
F4	6	N.A. ($\alpha < 0$)	N.A. ($\alpha < 0$)	N.A. ($\alpha < 0$)	N.A. ($\alpha < 0$)	N.A. ($\alpha < 0$)

Table A6. Cronbach's α by subgroup (listwise deletion). Items were assigned from the full-sample EFA using |primary loading| $\geq .40$ and |second| $\leq .30$; cross-loaders were excluded. Items were reverse-scored per the codebook. For Factor 4, Cronbach's α was non-positive in the computed results ($\alpha < 0$) in all groups; therefore, it is reported as N.A. because internal consistency is not supported. This may reflect heterogeneous content and/or coding issues (e.g., reverse-keying), which should be re-checked in future measurement refinement.