




Clustering Innovation Behaviors Using Machine Learning: Roles of Future Time Perspective and Proactive Motivation

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1. Round 1

1.1. Reviewer 1

Reviewer:

The aims are stated narratively in the Methods (p.4), but explicit, testable research questions or hypotheses are not clearly enumerated as a dedicated subsection in the retrieved text. Given the combination of unsupervised learning and subsequent predictive modeling, I recommend adding a concise set of RQs/Hs (e.g., expected number/nature of clusters; directional expectations for FTP and proactive motivation predicting higher-innovation clusters) to improve the paper's argumentative coherence and reduce the impression of "analysis-driven" findings.

The sample is purposively drawn from "knowledge-intensive sectors across Spain" with 458 valid responses (p.4). While this is a solid N for clustering and multinomial modeling, purposive recruitment via networking platforms/email (p.4) raises questions about selection bias and representativeness. Please report more granular sample characteristics (industry breakdown, organizational size, job types, tenure) and discuss how these might shape innovation-stage behaviors and the resulting cluster thresholds; otherwise, the practical claims may overgeneralize beyond the sampled contexts.

The use of MANOVA to test differences across clusters on the innovation dimensions is appropriate, and the paper reports significant multivariate effects and Tukey HSD indicating all clusters differ on every innovation dimension (p.6). That said, because the clusters are *constructed from these same variables*, significance testing can be tautological unless framed carefully. I recommend emphasizing effect sizes and practical separation (e.g., centroid distances, silhouette values, within-cluster dispersion) and adding a visualization (profile plot of standardized means) to make the distinctions transparent and substantively meaningful.

Authors revised the manuscript and uploaded the new document.

1.2. Reviewer 2

Reviewer:

The paper states that established scales were used (innovation behaviors as a multidimensional scale; FTP from a validated adaptation of ZTPI future subscale; proactive motivation via an inventory capturing self-starting/proactive/persistent behaviors; all on five-point Likert scales) and that instruments were translated using forward-back translation and showed “high internal consistency” (p.4). However, the reviewability of the study would improve substantially by reporting *actual* reliability and validity evidence (e.g., Cronbach’s α/ω ; if applicable CR/AVE; factor structure checks), rather than qualitative statements—especially because all key variables are self-reports and used in both clustering and prediction.

The limitations appropriately acknowledge that “self-reported questionnaire data introduces the potential for common method bias and social desirability effects” (p.9). Still, the manuscript would be stronger if it described procedural and/or statistical remedies implemented during analysis (e.g., temporal separation, marker variable, common latent factor), or at minimum justified why CMB is unlikely to fully explain the observed clustering structure and regression separation. As written, readers are left uncertain whether the “profiles” partly reflect response-style artifacts rather than distinct behavioral patterns.

The three-cluster solution (Passive/Moderate/High Innovators) is intuitively interpretable (p.6), and the manuscript indicates typical validation via elbow/silhouette in other excerpts you shared earlier. However, K-means assumptions (spherical clusters, Euclidean distance, sensitivity to initialization and scaling) warrant explicit justification given psychological survey data. Please report robustness checks (multiple random starts, stability across splits/bootstraps, alternative k, or alternative algorithms such as GMM/k-medoids) to demonstrate that the three-profile solution is not an artifact of initialization or scale properties.

Authors revised the manuscript and uploaded the new document.

2. Revised

Editor’s decision after revisions: Accepted.

Editor in Chief’s decision: Accepted.