

BEHAVIORAL SEGMENTATION AND PERSONALIZED GAMIFICATION MODEL BASED ON EMPLOYEE SENIORITY IN RETAIL SECTOR

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Abstract

Standard approaches to employee motivation in the retail sector are often insufficient due to staff diversity, and increasing competition necessitates innovative strategies to sustain sales performance. Uniform motivation strategies do not produce the same effect on employees with varying experience levels, particularly in large-scale businesses. This study posits that behavioral segmentation based on employee tenure can establish an effective foundation for developing personalized gamification approaches as a motivational strategy. The research analyzed the relationship between employee tenure and sales behavior (cross-selling/bundling) using sales and employee data from a male apparel retailer for the year 2024, aiming to present a personalized gamification framework based on this analysis. The results of this analysis revealed that higher levels of tenure are statistically and positively associated with an employee's tendency to sell a greater variety of products together. For newer staff, task- and badge-based gamification mechanics are proposed to enhance their cross-selling skills, while for long-tenured employees, the focus is on increasing motivation through mentorship roles and goals requiring expertise. This study demonstrates that behavioral segmentation derived from sales data provides a concrete roadmap for transitioning from theoretical models to practical and implementable motivation strategies.

Keywords: gamification, motivation, retail sector, data analysis

1. INTRODUCTION

The retail sector faces an increasingly complex challenge in managing and motivating a diverse workforce. Modern retail environments bring together employees from different generations, with varying levels of experience, expectations, and career aspirations. This diversity, while valuable, creates significant difficulties for organizations attempting to implement effective motivation strategies. The presence of individual differences directly affects employee expectations, emotions, and ultimately job performance, making standard or general motivational approaches insufficient (Fasasi, 2020). The wide variation in individual characteristics, including intelligence, personality, and developmental background, further differentiates work behaviors and outcomes (Kasuma, 2024). Consequently, what motivates a newly hired sales associate differs substantially from what drives a seasoned professional with years of experience, yet most organizations continue to apply one-size-fits-all solutions. Organizations must maintain high performance standards while simultaneously addressing employee engagement and satisfaction. To remain competitive, organizations face a continuous obligation to improve the quality of their human resources (Tj, 2022). The importance of this challenge is underscored by its potential impact: when managers struggle to motivate employees, it can lead to job dissatisfaction, and when dissatisfied employees exhibit low performance, this situation damages company profitability (Roberts, 2024). These consequences such as reduced sales performance, decreased customer satisfaction, and higher turnover rates directly impact organizational profitability and market competitiveness, creating an urgent need for innovative approaches that go beyond conventional reward systems.

However, the standard motivational strategies commonly employed in retail settings have proven inadequate for addressing this need. Fixed bonus structures and "employee of the month" programs demonstrate limited effectiveness across diverse employee populations. Traditional motivational tools based on extrinsic incentives, such as fixed salaries and basic bonuses, are increasingly insufficient in

maintaining employee commitment and high performance in dynamic and stressful environments (Kotlyk & Tereshchenko, 2025; Woźniak, 2020). Historically, motivation systems adopted since the early 20th century and built on reward and punishment have proven insufficient for the non-algorithmic, creative, and conceptual tasks required by modern economies (Pink, 2009). These standardized approaches may inadvertently create perceptions of unfairness or fail to engage significant portions of the workforce, precisely because they ignore the fundamental differences in what motivates employees at various stages of their careers. Recognizing these limitations, scholars increasingly emphasize the importance of personalization in motivation strategies. When designing motivational strategies, not only demographic or cultural differences but also the specific effects of extrinsic and intrinsic motivation sources on each individual must be taken into account (Collige, 2024). For success in competitive environments, motivation strategies must be personalized by considering each employee profile's basic psychological needs such as autonomy, competence, and relatedness, and designed to support intrinsic motivation (Ryan & Deci, 2020).

Addressing these interrelated challenges requires a fundamental shift in how organizations approach employee motivation. This study proposes that employee tenure can serve as a practical foundation for behavioral segmentation and personalized gamification design. While existing literature recognizes the importance of personalization in motivation, there remains a significant gap in understanding how to operationalize this concept in retail settings. Most segmentation approaches rely on demographic or personality assessments that are subjective and difficult to implement at scale. Tenure, by contrast, is objective, readily available, and may reflect meaningful differences in employee capabilities and motivational needs. This research aims to investigate whether employee tenure correlates with observable sales behaviors specifically product variety in transactions and whether these differences are substantial enough to warrant differentiated motivational approaches. The findings seek to provide retail organizations with an evidence-based framework for moving beyond one-size-fits-all motivation systems toward segment-specific gamification strategies that align with the natural progression of employee development and capabilities.

2. MATERIAL AND METHOD

2.1. Research Scope and Data Set

This investigation is specifically situated within the operational context of a national retail organization in the men's apparel sector. For the purpose of the analysis, we utilized quantitative archival data. This data was obtained directly from the company's central Enterprise Resource Planning (ERP) system, ensuring a high degree of objectivity. The dataset was defined to cover the complete operational period of the 2024 fiscal year. This extraction provided comprehensive information by integrating two primary data types: employee records (which included employee seniority details) and detailed sales transaction logs.

The initial raw dataset was substantial in volume, containing 4.86 million distinct data rows. These rows corresponded to 1.37 million individual purchase transactions recorded during the period. Following necessary procedures for data cleaning and preparation, this transactional data was aggregated to the employee level. This process resulted in the final analytical sample for our study, which consists of 1,524 unique sales employees. This methodology ensures that our subsequent analysis is grounded in objective, real-world performance metrics rather than subjective assessments.

2.2. Variables and Operationalization

Dependent Variable: The primary outcome variable was defined as "Product Variety". This metric was operationalized by calculating the total number of unique product categories (e.g., trousers, shirts, accessories) sold by an individual employee during the 2024 analysis period. This variable serves as a proxy for the employee's behavioral tendency towards cross-selling or bundle-selling, indicating a more complex sales approach.

Independent Variable: The main predictor variable was "Employee Tenure". This variable was operationalized in two distinct ways to facilitate different analyses: first, as a continuous variable measuring the total duration of employment (in months or years), and second, as a categorical variable. For the categorical analysis, employees were segmented into five distinct groups based on their time

with the company: New Starter (0-1 year) , Junior (1-3 years) , Mid-Level (3-6 years) , Senior (6-10 years) , and Expert (10+ years).

Control Variables: The analysis also identified several demographic and structural variables to be controlled for. These include the employee's gender , age , store , and official job title. These factors were included to isolate the specific effect of tenure on product variety

2.3. Data Preparation

The data preparation phase involved a multi-step process to transform the raw, transaction-level data into a structured, aggregated dataset suitable for hypothesis testing. The initial dataset, consisting of 4.86 million transaction lines, was first cleaned to ensure consistency and remove anomalies.

The primary task in this stage was the aggregation of this transactional data to the individual employee level. This procedure resulted in the final analytical sample of 1,524 employees. During this aggregation, the key variables for the study were computed and operationalized.

The dependent variable, "Product Variety," was computed for each employee by counting the distinct product categories associated with their sales over the year. This metric was intentionally selected as a high-level performance indicator. The ability to execute a bundled sale (cross-selling) is considered a complex competency; it requires a synthesis of deep product knowledge, effective customer relationship management, and advanced sales skills. It is therefore a more sophisticated performance indicator compared to single-item transactions and is ideal for capturing behavioral development correlated with tenure.

2.4. Statistical Analysis

The statistical analysis for this study was structured as a sequential, multi-stage process designed to rigorously test the research hypotheses. The primary objective was to determine the nature and significance of the relationship between the independent variable (Employee Tenure) and the dependent variable (Product Variety). The entire analytical pathway was contingent upon the distributional properties of the data, necessitating a foundational step of assumption testing.

The selection of an appropriate statistical methodology was dependent upon testing the data against the assumptions required for parametric tests (such as ANOVA or Pearson Correlation). Therefore, the analysis commenced by evaluating two critical assumptions. First, the assumption of normality, which posits that the dependent variable is normally distributed within each group, was evaluated using the Shapiro-Wilk test. The test results indicated that at least one of the tenure groups failed the test for normality ($p < 0.05$). This finding demonstrated that the 'Product Variety' data was not normally distributed across the groups, thus violating the first major assumption. Second, the assumption of homogeneity of variances, which requires that the variance of the dependent variable is equal across all tenure groups, was assessed using the Levene test. The Levene test also produced a p-value below the 0.05 significance threshold. This result confirmed that the variances were heterogeneous (unequal) across the groups. Given the significant violation of both the normality and homogeneity of variance assumptions, the use of standard parametric tests was deemed statistically inappropriate and would likely yield unreliable conclusions. Consequently, the study proceeded with a non-parametric analytical strategy. Non-parametric tests are "distribution-free" and do not rely on these strict data distribution assumptions, ensuring a more robust and accurate analysis for this type of real-world data.

To address the research question, whether a statistically significant difference in 'Product Variety' exists among the five distinct employee tenure groups, the Kruskal-Wallis H Test was employed. This test is the appropriate non-parametric equivalent of the one-way ANOVA. It is specifically designed to determine if there are statistically significant differences between two or more independent groups on a continuous or ordinal dependent variable. The test functions by comparing the medians (rather than the means) of the groups. The results of this test were definitive. The analysis yielded a Kruskal-Wallis H-statistic of 376.1953, with a corresponding p-value significantly less than 0.05 ($p < 0.05$). The extremely high value of the H-statistic indicates a very large effect size, signifying a substantial and meaningful difference in sales behavior between the groups. The statistically significant p-value allowed for the strong rejection of the null hypothesis (which states there is no difference between the groups). This

finding provided the first piece of empirical evidence: the tenure groups are behaviorally distinct, and at least one group's 'Product Variety' performance is significantly different from the others.

While the Kruskal-Wallis test confirmed that a difference existed, it did not describe the direction or strength of the relationship across the tenure continuum. A junior employee might be different from a senior, but this test alone does not confirm that performance systematically increases with tenure. To address the primary research hypothesis (H1) that a positive relationship exists between tenure and product variety, a correlation analysis was required. For this purpose, the Spearman's Rank Correlation was selected. It was chosen because it is specifically designed to measure the strength and direction of a monotonic relationship between two variables, without requiring a normal distribution. It perfectly suited the study's need to test the alternative hypothesis (H1: a positive relationship exists) against the null hypothesis (H0: no positive relationship exists). The Spearman's Correlation analysis produced a correlation coefficient (Rho) of 0.5914. This value indicates a moderate-to-strong positive relationship between the rank of employee tenure and the rank of product variety sold. This finding was highly statistically significant, with a p-value well below the 0.05 threshold ($p < .05$). It strongly supports the study's central thesis: as employee tenure increases, their tendency to engage in complex sales behaviors also systematically and significantly increases.

3. CONCLUSION

This study was initiated to address the growing insufficiency of standardized, "one-size-fits-all" motivational strategies within the diverse and highly competitive retail sector. We proposed that employee tenure, an objective and readily available data point, could serve as a robust foundation for behavioral segmentation and the subsequent design of personalized gamification strategies. The empirical evidence gathered provides substantial support for this central thesis, demonstrating clear, data-driven pathways for moving beyond generalized incentives.

The statistical analysis provided the essential, solid ground upon which this entire personalization model is built. The results were not ambiguous. First, the Kruskal-Wallis H Test yielded a statistic ($H = 376.1953$) of overwhelming significance ($p < 0.001$). This result provides definitive, empirical proof that the five distinct employee tenure groups are not homogenous; they exhibit statistically significant differences in their real-world sales behaviors, specifically their capacity to sell a variety of products (cross-selling). This finding alone invalidates any motivational strategy that treats these distinct groups as a single entity. Second, the Spearman's Rank Correlation analysis provided the critical context for why these groups are different. The analysis revealed a moderate-to-strong, positive, and highly significant correlation ($\rho = 0.474$, $p < 0.001$) between an employee's tenure and their product variety sales. This demonstrates that the observed behavioral differences are not random; they are part of a systematic progression. As employees gain experience (increase in tenure), their capability to handle complex sales, manage broader product knowledge, and engage in cross-selling systematically increases. These two findings, when taken together, create an indisputable rationale for personalization. The Kruskal-Wallis test proves that segmentation is necessary (the groups are different), and the Spearman's test shows how to segment (based on the developmental progression of tenure). It is this data-driven foundation that mandates a shift from a singular, standardized bonus system to a multi-stage, personalized gamification framework that aligns with the evolving needs and capabilities of each career stage.

Based on this statistical evidence, we propose the following five-stage, personalized gamification model. Each stage is tailored to the distinct behavioral profile and motivational needs of the corresponding tenure segment.

For the New Starter (0-1 Year) segment, which constitutes the largest portion of the workforce (39%) but has the lowest average product variety (29.1), the strategic objective must be foundational skill development and building self-confidence. These employees require clear direction and immediate, positive reinforcement to overcome the initial complexity of the role. Therefore, a highly structured, Task-Based System is recommended, breaking down complex sales into small, achievable micro-goals such as "Complete your first combined sale," "Add an accessory," or "Sell from 2 categories". Success in these tasks should be recognized through a Badge Collection system ("First Step," "Fast Learner") to

provide tangible feedback for small victories. A crucial component for this group is Mentor Matching, pairing them with a Senior employee for guided social learning and integration.

As employees transition to the Junior (1-3 Years) stage, their profile changes. This group (37% of the sample) shows a significant performance leap (avg. variety 39.9), indicating they have mastered the basics. The strategic objective thus shifts to skill deepening and specialization. Having acquired basic skills, they are now ready to develop specific areas of expertise and are motivated by social comparison and progression. The model proposes mechanics such as Specialization Paths ("Accessory Expert," "Suit Master") that encourage deep knowledge. Team Competitions and weekly store leaderboards can leverage their growing confidence for social motivation, while more complex Cross-Selling Missions (e.g., "3+ category combinations") provide challenging and engaging goals.

The Mid-Level (3-6 Years) employee, while a small segment in this dataset (1.7%), represents a critical stage of high competence (avg. variety 42.7). The strategic objective for this group must evolve beyond simple sales metrics to focus on the recognition of their expertise and the development of leadership skills. These employees are highly competent and are now motivated by social validation (recognition) and influence, not just basic targets. Gamification for them should include Advanced-Level Goals ("Premium combination sale") but, more importantly, must introduce status and leadership-based rewards. These include Leadership Roles via "Mentor of the Week" or "Team Leader" badges, which formally recognize their social capital. Furthermore, they should receive Knowledge Sharing Rewards for actively training and mentoring the New Starters, reinforcing their own sense of mastery.

Following this, the Senior (6-10 Years) segment (4.1% of sample, avg. variety 41.7) consists of employees for whom standard sales tasks have become routine and are no longer intrinsically motivating. The strategic objective for them is to transform their deep expertise into tangible corporate contribution and to provide prestige recognition. Their motivation must come from strategic impact and status. The model proposes a shift away from basic tasks toward Strategic Goals tied to overall store performance. A Prestige Badge System ("Platinum Consultant," "Master Stylist") reinforces their elite status. Critically, they should be granted Special Privileges, such as participating in product selection workshops or new-season trend-spotting, which leverages their expertise and reinforces their value beyond individual sales.

Finally, the Expert (10+ Years) segment represents the smallest (0.8%) and most experienced cohort, possessing the highest average product variety (43.4). For this group, financial rewards are secondary to meaning, purpose, and impact. The strategic objective is to deepen their corporate bond and empower them to create a lasting legacy. Their motivation is existential. The model proposes a Brand Ambassadorship Program, where they consult on new store openings, or Strategic Consultancy roles, where they earn recognition for contributing to regional strategies. Legacy Missions, which reward them for the successful development of future leaders and the formal transfer of their knowledge, directly appeal to their need to create a meaningful impact and solidify their long-term commitment.

While this study provides a robust, data-driven framework, it is essential to acknowledge its limitations, which in turn illuminate pathways for future research.

First, the study faces a Scope Limitation; the analysis was conducted within a single firm in the male apparel retail sub-sector. This context-specific nature limits the direct generalizability of the findings to other retail environments, such as grocery, electronics, or luxury goods, which possess different sales dynamics. Second, the study relies on a Cross-Sectional Data Structure. The data provides a snapshot of the year 2024, which allows for the identification of strong correlations but does not permit the establishment of definitive causation. We can confidently state that tenure and cross-selling behavior are linked, but we cannot, from this data alone, prove that one causes the other. Third, the proposed gamification framework is, at this stage, a Theoretical Model. While it is empirically grounded in the observed behavioral data, it has not yet been implemented or field-tested to validate its practical effectiveness and impact on motivation or sales performance. Finally, the analysis intentionally focused on tenure as the primary independent variable. While this provides a clear and objective segmentation, it did not include other significant Demographic or Structural Variables (such as age, gender, or store location) in a moderating capacity.

These limitations provide a clear agenda for future research. To address External Validity, the model should be tested in different retail sub-sectors to determine its adaptability. To address the issue of causality, a Longitudinal Study design is recommended, tracking employee cohorts over several years to observe the process of behavioral development as tenure increases. The most critical future step is to conduct an Impact Analysis. The proposed model should be implemented in a real-world setting, ideally using a Randomized Controlled Trial (RCT) or an A/B test. This would allow for the scientific measurement of the model's effectiveness against a control group using the traditional, standardized motivation system. Furthermore, future studies should incorporate Moderation Analysis to investigate the role of demographic factors, answering questions such as, "Is this model more or less effective for Gen Z employees compared to older cohorts?". In conclusion, this research successfully demonstrates that employee sales behavior is not static; it evolves systematically with tenure. By analyzing this evolution, this study provides a concrete, data-driven roadmap for retail organizations to move beyond ineffective, one-size-fits-all incentives and toward personalized, segment-specific gamification strategies that motivate employees at every stage of their career.

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