



Motivational Profiles and Objective Performance Outcomes: A Field Study in the Furniture Manufacturing Sector

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Graphical/Tabular Abstract (Grafik Özet)

In this study, a person-centered two-stage cluster analysis (Ward's and K-means) identifies high- and low-motivation profiles under Self-Determination Theory. Regression analysis revealed that amotivation significantly reduces efficiency ($\beta=-9.79$), while autonomous and controlled motivation improve productivity, as confirmed by objective production performance indicators. / Bu çalışmada, kişi merkezli iki aşamalı kümeleme analizi (Ward ve K-means) yöntemi kullanılarak, Öz Belirleme Teorisi çerçevesinde yüksek ve düşük motivasyon profilleri belirlenmiştir. Regresyon analizi, amotivasyonun verimliliği önemli ölçüde azalttığını ($\beta=-9.79$) ortaya koyarken, özerk ve kontrollü motivasyonun üretkenliği artırdığı, objektif üretim performans göstergeleriyle doğrulanmıştır.

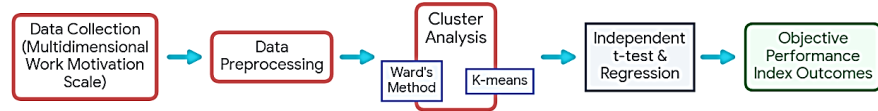


Figure A: Motivational profiles analysis process / Şekil A: Motivasyon profilleri analiz süreci

Highlights (Önemli noktalar)

- Objective performance was measured using industrial metrics rather than subjective surveys. / Nesnel performans, öznel anketler yerine endüstriyel ölçütler kullanılarak ölçüldü.
- A person-centered approach identified distinct high- and low-motivation profiles among workers. / Kişi merkezli bir yaklaşım ile çalışanlar arasında belirgin yüksek ve düşük motivasyon profilleri ortaya çıkarıldı.
- It has been confirmed that a lack of motivation negatively affects operational efficiency. / Motivasyon eksikliğinin operasyonel verimliliği olumsuz etkilediği belirlendi.
- It was found that performance improvements are closely related not only to external incentive programs but also to the extent to which employees make sense of and internalize their work tasks. / Performans artışlarının sadece dışsal teşvik programlarıyla değil, aynı zamanda çalışanların iş görevlerini ne ölçüde kavradıkları ve içselleştirdikleriyle de yakından ilişkili olduğu ortaya çıkmıştır.

Aim (Amaç): This study aims to identify employees' multidimensional work motivation profiles within the framework of Self-Determination Theory (SDT) and to analyze their effects on objective performance outcomes. / Bu çalışma, Öz Belirleme Teorisi (SDT) çerçevesinde çalışanların çok boyutlu iş motivasyonu profillerini belirlemeyi ve bunların nesnel performans sonuçları üzerindeki etkilerini analiz etmeyi amaçlamaktadır.

Originality (Özgünlük): Unlike traditional, variable-focused, and subjective studies of motivation based on individuals' self-reports, this research adopts a person-centered clustering approach and directly aligns psychological profiles with empirical job records calculated using industrial work standards. / Geleneksel, değişken odaklı ve öznel, bireylerin kendi beyanlarına dayalı motivasyon çalışmalarından farklı olarak, bu araştırma kişi odaklı bir kümeleme yaklaşımını benimsemekte ve psikolojik profilleri, endüstriyel iş-çalışma standartları aracılığıyla hesaplanan ampirik iş kayıtlarıyla doğrudan eşleştirmektedir.

Results (Bulgular): A two-stage cluster analysis identified two distinct profiles (high motivation and low motivation). Regression models show that low motivation is the strongest negative predictor of productivity, while both autonomous and controlled motivation significantly increase objective performance. / İki aşamalı küme analizi, iki farklı profil (yüksek motivasyon ve düşük motivasyon) belirlemiştir. Regresyon modelleri, motivasyon eksikliğinin verimliliğin en güçlü olumsuz belirleyicisi olduğunu gösterirken, hem özerk hem de kontrollü motivasyonların nesnel performansı önemli ölçüde artırdığını ortaya koymaktadır.

Conclusion (Sonuç): Sustainable productivity in labor-intensive production processes requires a shift away from relying solely on external incentives toward implementing job designs that support autonomy and help reduce employee motivation loss. / Emek yoğun üretim süreçlerinde sürdürülebilir verimlilik, yalnızca dışsal teşviklere dayanmaktan, özerkliği destekleyen ve çalışanların motivasyon kaybını azaltmaya yardımcı olan iş tasarımlarının uygulanmasına doğru bir geçişi gerektirmektedir.



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Abstract

This study aims to identify the motivation profiles of employees in the furniture manufacturing sector and analyze the effects of these profiles on objective performance. The primary objective of the research is to determine employees' levels of autonomous motivation, controlled motivation, and amotivation, and to evaluate the decisive role these factors play in work performance, as measured by operational efficiency indicators. The study also examines differences in roles within the production process in order to evaluate motivation in further detail. In this study, performance was measured objectively using a Performance Index calculated based on standard time, production volume, and actual working time data, rather than subjective evaluations. This approach offers the opportunity to measure the impact of psychological factors within the Self-Determination Theory (SDT) framework on actual productivity in the production field. In the data analysis, after confirming the validity and reliability of the Multidimensional Work Motivation Scale, a person-centered rather than a variable-centered approach was adopted. In this context, a two-stage clustering analysis (Ward's method and K-means) was applied to divide employees into homogeneous groups, and the performance differences between the resulting profiles were tested using independent samples t-tests and multiple regression analyses. Unlike similar studies in the literature, this study is novel in that it approaches motivation from a profile-based perspective rather than through individual variables and measures performance using a numerical index calculated based on work study standards rather than a survey. The findings indicate that performance improvement in the sampled furniture manufacturing facilities is closely related not only to external incentives but also to the extent to which employees make sense of and internalize their work tasks. This study contributes to the literature by connecting types of motivation with objective performance data.

Motivasyon Profilleri ve Nesnel Performans Sonuçları: Mobilya İmalat Sektöründe Bir Saha Çalışması

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Öz

Bu çalışma, mobilya üretim sektöründe çalışanların motivasyon profillerini belirlemeyi ve bu profillerin nesnel performans üzerindeki etkilerini analiz etmeyi amaçlamaktadır. Araştırmanın temel amacı, çalışanların otonom motivasyon, kontrollü motivasyon ve amotivasyon düzeylerini ortaya koymak ve bu yapıların operasyonel verimlilik göstergeleriyle hesaplanan çalışma performansı üzerindeki belirleyici rolünü değerlendirmektir. Çalışmada ayrıca, motivasyonu daha ayrıntılı bir şekilde değerlendirmek amacıyla üretim sürecindeki rol farklılıkları da incelenmiştir. Çalışmada performans, öznel değerlendirmelere dayalı ölçümler yerine standart zaman, günlük üretim miktarı ve fiili çalışma süresi verileri kullanılarak hesaplanan Performans İndeksi aracılığıyla nesnel olarak ölçülmüştür. Bu yaklaşım, Öz-Belirleme Kuramı (SDT) çerçevesindeki psikolojik unsurların üretim sahasındaki somut verimliliğe olan yansımaları ölçümleme fırsatı sunmaktadır. Veri analizinde, Çok Boyutlu İş Motivasyonu Ölçeği'nden elde edilen verilerin yapı geçerliliği ve güvenilirliği doğrulandıktan sonra, değişken odaklı analizlerin ötesine geçilerek kişi odaklı bir yaklaşım benimsenilmiştir. Bu kapsamda, çalışanları homojen gruplara ayırmak için iki aşamalı kümeleme analizi (Ward yöntemi ve K-means) uygulanmış, ortaya çıkan profiller arasındaki performans farkları ise bağımsız örneklem t-testi ve çoklu regresyon modelleri ile test edilmiştir. Bu çalışma, literatürdeki benzerlerinden farklı olarak, motivasyonu tekil değişkenler yerine profil temelli bir bakış açısıyla ele alması ve performansı anket yoluyla değil, iş etüdü standartları üzerinden hesaplanan sayısal bir indeksle ölçmesi bakımından özgün bir nitelik taşımaktadır. Elde edilen bulgular, örneklemdeki mobilya üretim tesislerinde performans artışının yalnızca dışsal teşviklerle değil, çalışanların işi anlamlandırma ve içselleştirme düzeyiyle yakından ilişkili olduğunu göstermektedir. Çalışma, motivasyon türlerini nesnel performans verileriyle ilişkilendirmesi bakımından literatüre katkı sunmaktadır.

1. INTRODUCTION (GİRİŞ)

In today's modern production ecosystem, where global competition is intensifying rapidly, a company's ability to achieve sustainable productivity gains depends not only on technological infrastructure but also on the effective management of human capital. While productivity in the manufacturing sector is often viewed through the lens of machinery and process optimization, the motivation of the workforce, which is the primary driver of these processes, plays a decisive role in operational outcomes. However, in labor-intensive industries such as furniture manufacturing, where such processes are common, managing employee motivation and converting it into specific performance outcomes presents a fundamental challenge.

A significant portion of the existing literature faces two fundamental limitations. First, most motivation studies adopt a "variable-centered" approach, overlooking how different types of motivation (intrinsic, extrinsic, identified, etc.) coexist within an individual and influence one another. Second, and more critically, performance measurements are typically conducted using "subjective" methods based on employees' or managers' self-reports. Subjective measures may fail to accurately reflect actual productivity due to factors such as social desirability bias and the halo effect. To fill this gap in the literature, this study adopts a "person-centered" approach within the framework of Self-Determination Theory (SDT). By recognizing that motivation differentiates performance not only in quantity but also in quality, a profile-based analysis was conducted. One of the most significant elements enhancing the originality of this study is its integration of limited field data from Turkey's manufacturing sector with objective performance indices derived from business records. Matching objective production outputs with motivational profiles enables the validation of theoretical findings with practical business outcomes. In this context, the primary objective of this study is to identify the motivation profiles of employees at the furniture manufacturing facilities participating in the study using cluster analysis, to examine whether these profiles exhibit significant differences in objective performance indices, and to determine the most critical motivation type for operational efficiency. To achieve these objectives, the following questions are addressed:

Q1: How many different profiles (clusters) are there among employees based on their motivational characteristics?

Q2: Do these identified motivation profiles show statistically significant differences in objective performance index scores?

Q3: Which of the different types of motivation provides a stronger explanation for employees' production performance?

2. CONCEPTUAL FRAMEWORK

(KAVRAMSAL ÇERÇEVE)

2.1. Self-Determination Theory (Öz Belirleme Kuramı)

Self-Determination Theory (SDT), one of the most comprehensive approaches in the literature on modern work motivation, examines the motivational mechanisms underlying employee behavior in terms of quality rather than quantity [1]. While traditional approaches typically classify motivation as either low or high, SDT argues that motivation varies along a continuum based on the degree of autonomy [2].

At the heart of the theory are three fundamental psychological needs necessary for the psychological development and optimal functioning of employees: autonomy, competence, and relatedness [3]. Autonomy refers to employees' perception that they initiate their own behavior; competence refers to the feeling of being capable of performing tasks; and relatedness refers to the need to form meaningful connections with other employees in the workplace [4]. Satisfying these three needs enhances performance and well-being by facilitating the internalization of external regulations [5].

SDT divides motivation into two main categories:

1. **Autonomous Motivation:** This refers to an employee performing an activity because they find it interesting (intrinsic motivation) or because they have internalized the value of the activity (integrated regulation). Gagné and Deci (2005) note that in situations where autonomous motivation is high, employees demonstrate greater effort, are more creative, and exhibit more positive psychological well-being [1].

2. **Controlled Motivation:** This refers to behavior driven by external factors, such as rewards, punishments, or feelings of shame (external/internal pressure). A review of the literature indicates that while controlled motivation may yield short-term outcomes, it can lead to burnout and low job satisfaction in the long term [6].

Particularly in fields with intensive operational processes, such as the manufacturing sector, structuring job design to support these fundamental needs has a positive impact on employees'

motivational profiles [7]. In this context, SDT defines individuals not merely as passive entities driven by external factors but as active agents who construct their own motivation through interaction with their environment [8].

2.2. Work Motivation and Performance (İş Motivasyonu ve Performansı)

The relationship between motivation and performance has been treated as a strategic priority in the literature for many years. Although the traditional perspective assumes that high motivation directly leads to high performance, modern research emphasizes that this is not entirely accurate and that outcomes may vary depending on the type of motivation and the nature of the work [1]. In furniture production lines, where physical labor and technical skills are important, the extent to which employees are voluntarily engaged in the work rather than merely present can determine a decisive threshold for operational outcomes.

In the manufacturing sector, performance is typically evaluated based on measurable indicators, such as error rates, production speed, and resource utilization. A study conducted by Lorincová et al. (2016) in the furniture manufacturing sector examined the motivational factors influencing employee job satisfaction and found that, in particular, finding the work interesting and being able to utilize one's own skills were among the factors providing the highest levels of job satisfaction. However, the study emphasized that even though they are not directly evaluated through performance metrics, employees with high motivation levels can contribute to organizational efficiency [9]. The relationship between motivation and performance is shaped by an individual's psychological and organizational context rather than being a linear and uniform process. Within the SDT framework, the extent to which employees' basic psychological needs are met significantly influences their psychological state and work behaviors. Shuck et al. (2015) demonstrated that psychological needs are positively associated with employee engagement. However, it is emphasized that the relationship between engagement and performance indicators is not consistent across all measurements and may vary depending on contextual factors. These findings suggest that psychological mediating mechanisms and contextual conditions can play a decisive role in the performance outcomes of the motivational processes [5].

Particularly in industries where routine processes, such as assembly and production lines, are prevalent, analyzing employee motivation profiles

is critical for understanding which group demonstrates higher objective performance [7]. Considering performance not merely as an output-focused outcome but as a natural reflection of a motivational process has become a fundamental requirement in modern management philosophy.

2.3. The Motivation Profile Approach (Motivasyon Profili Yaklaşımı)

The variable-centered approach traditionally adopted in the literature on motivation focuses on examining the effect of a specific type of motivation (e.g., intrinsic motivation) on an output, such as performance [1]. However, this approach neglects the fact that employees may simultaneously experience multiple types of motivation at different levels. In fact, in real-world work environments, an employee may be highly motivated simultaneously by their interest in their job (intrinsic) and financial rewards (extrinsic). To understand this complex structure, person-centered analytical methods have become increasingly prominent in recent years [10].

The person-centered approach aims to group individuals with similar motivational characteristics into various profiles, rather than viewing the sample as a homogeneous whole [6]. At this point, cluster analysis is one of the fundamental statistical tools used to identify hidden patterns in data and to categorize employees into naturally formed groups. By maximizing similarities among individuals while also maximizing differences between clusters, cluster analysis provides researchers with a more refined perspective [11].

Studies in the literature have generally addressed different motivational profiles. Moran et al. (2012) examined the types of motivation within the SDT framework using an individual-based approach and found that employees clustered into distinct combinations of motivation. The research findings identify five distinct motivation profiles: "low introjection," "moderately motivated," "low autonomy," "self-determined," and "motivated" [12]. In a study conducted by Howard et al. (2016), it was demonstrated that a profile-based approach, which focuses not only on the quantity of motivation but also on how its different types interact within an individual, is significant. The research findings indicate that employees are categorized into distinct motivation profiles, which are associated with organizational outcomes such as job satisfaction, engagement, and performance at varying levels [10].

The clustering approach used in this study allows for the evaluation of workers' motivational structures on a furniture production line not only

through a single variable but as a whole. This enables a much more comprehensive answer to the question of who performs better from the perspective of how variables influence one another. In particular, techniques such as K-means clustering provide an objective and reliable basis for classifying employee performance patterns in large datasets [13].

3. METHODOLOGY (METODOLOJİ)

3.1. Research Model (Araştırma Modeli)

In this study, a conceptual research model was developed to examine the relationship between employees' motivation structures and their production performance (Figure 1). The model's fundamental assumption is that employees' motivation profiles significantly influence their performance. Within the scope of this research, the motivations of employees in the sampled furniture manufacturing firms were measured using the Multidimensional Work Motivation Scale (MDWMS), and the data obtained were used to categorize employees into different motivation profiles. These profiles consist of a combination of employees' levels of autonomous motivation, controlled motivation, and amotivation. It is hypothesized that established motivation profiles are a key factor in determining employees' performance in the production process. In the model, motivation profiles were treated as independent variables, while the performance index served as the dependent variable. The performance index serves as an objective evaluation criterion that reflects employees' productivity in the production process and constitutes the primary output of this study. Within this framework, the research model was designed to examine the impact of motivation profiles on performance. The model aims to demonstrate that employees' motivation structures are determinative not only of individual attitudes but also of concrete performance outcomes.

In this study, the relationships between employees' motivational structures and their performance levels were examined within the SDT framework. Accordingly, the following hypotheses were proposed:

H1: As employees' levels of amotivation increase, their performance levels decrease.

This hypothesis assumes that employees' perceptions of disinterest and meaninglessness in their work negatively impact their performance.

H2: Employees' performance levels increase as their autonomous motivation increases.

This hypothesis assumes that individuals who internalize their work and act in accordance with their values will enhance their performance.

H3: Employees' levels of controlled motivation positively affect performance.

This hypothesis assumes that employees motivated by external rewards, job security, and managerial expectations can enhance performance.

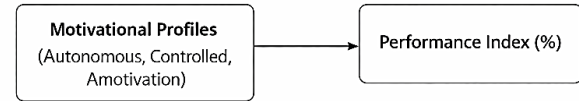


Figure 1. Research model (Araştırma Modeli)

3.2. Sample (Örneklem)

The study population consisted of employees working in businesses operating in the furniture manufacturing sector. The businesses examined in this study operate in various sub-sectors of the furniture manufacturing industry. These include kitchen cabinets, wardrobes, tables, chairs, bedroom and youth room furniture, sofa sets, office and garden furniture, and MDF and particleboard-based modular products. Most of these businesses are small and medium-sized enterprises (SMEs), a common category in Turkey's furniture sector. These businesses typically operate using labor-intensive production processes and flexible production structures. The sample comprised 47 employees actively working in furniture manufacturing facilities. The measurements and surveys conducted as part of the study were conducted directly on the production field and in the employees' natural work environments. The sample selection process is based on a field sampling approach. First, senior managers at the companies where the research was to be conducted were interviewed to explain the study's purpose and scope, and the necessary permissions were obtained. During data collection, employees in the production field were randomly selected and informed about the study. Only employees who voluntarily agreed to participate were included in the research. Accordingly, the study adopted a field sampling approach combining voluntary participation and convenience sampling. The descriptive statistics and demographic characteristics of the sample are presented below:

- **Gender Distribution:** The sample consists primarily of male participants ($n = 45$); the number of female participants is quite limited ($n = 2$). For this reason, gender was not considered as a variable in statistical analyses.

- **Age and Experience:** While the age distribution of employees covers a wide range from 20 to over 61

years, the largest group is in the 20–30 age range ($n = 15$), followed by the 41–50 age range ($n = 14$). In terms of professional experience, 30% had 6–10 years, while 23% had 1–5 years.

- **Educational Background:** When examining the participants' educational levels, it was observed that primary school ($n = 18$) and high school ($n = 15$) graduates were in the majority, followed by bachelor's degree ($n = 9$) and associate degree ($n = 5$) graduates. All participants are actively involved in the production processes. Employees with higher education are involved in supervisory or technical roles (production supervisors, quality control staff). Other employees perform operational tasks within the production processes.

This sample, which represents a homogeneous structure across the sector, can reflect the workload and motivational processes at various stages of furniture production (cutting, edging, sanding, assembly, painting and varnishing, packaging, and CNC).

3.3. Data Collection (Veri Toplama)

3.3.1. Multidimensional Work Motivation Scale (Çok Boyutlu İş Motivasyonu Ölçeği)

The Multidimensional Work Motivation Scale (MDWMS), developed by Gagné et al. (2010) to determine employees' motivation levels and the nature of this motivation, and adapted into Turkish by Çivilidağ and Şekercioğlu (2017), was used in this study [14,15]. The scale comprises 19 items and includes sub-dimensions representing different sources of motivation. In this study, to ensure the analyses were interpretable, the scale was examined along the three basic dimensions of motivation commonly used in the literature: Autonomous Motivation, Controlled Motivation, and Amotivation (Table 1).

Participants rated the items on a 7-point Likert scale (1: Not at all agree, 7: Strongly agree). This structure allows for the assessment of employees' motivation levels from both quantitative and qualitative perspectives. Within the scope of this study, the scale's internal consistency was assessed using Cronbach's Alpha.

Table 1. Composite Motivation Dimensions (Bileşik Motivasyon Boyutları)

Variable	Number of Items
Autonomous Motivation	6
Controlled Motivation	10
Amotivation	3

3.4. Performance Index (Performans İndeksi)

Employee performance was evaluated using a "Performance Index" calculated from actual data collected in the field, rather than traditional, subjective metrics. This approach enables the measurement of employee productivity in furniture production workshops and facilities in accordance with industrial standards.

The performance index was calculated separately for each employee using Equation 1.

$$\text{Performance Index (\%)} = (\text{Total Standard Time (min)} \times 100) / (\text{Actual Working Hours (min)}) \quad (1)$$

3.5. Data Analysis (Veri Analizi)

In this study, data were analyzed using a multistage process to examine the relationships between employees' motivational patterns and performance levels. In the first stage, a reliability analysis was conducted to assess the validity of the measurement tool used. In this context, Cronbach's alpha coefficients were calculated for each composite motivational dimension, and the scale's internal consistency was tested. In the second stage, descriptive statistics were calculated to reveal the general structure of the dataset. Accordingly, the mean, standard deviation, minimum, and maximum values of the variables were analyzed. These analyses provided an important foundation for evaluating the distribution characteristics of the data and determining their suitability for subsequent analyses. In the third stage, Pearson's correlation analysis was conducted to examine the relationships between motivation dimensions and performance. This analysis determined the direction and strength of the relationships between the variables and served as a preliminary assessment for subsequent analyses.

In the fourth stage, a two-stage clustering analysis was conducted to group employees according to their motivation profiles. Initially, hierarchical clustering analysis was conducted utilizing the Ward method in conjunction with the Euclidean distance metric. The optimal number of clusters was ascertained by scrutinizing the merging steps. Based on the findings, a two-cluster structure was considered adequate and confirmed by K-means clustering analysis. In the fifth stage, an independent samples t-test was conducted to examine the effect of the identified motivation profiles on performance. This analysis compared the performance levels of employees with different motivation profiles and assessed whether the differences between them were statistically significant. In the final stage, multiple regression analysis was performed to determine the degree to

which the motivational dimensions explained performance. This analysis revealed the relative effects of autonomous motivation, controlled motivation, and amotivation on performance. This multistage analytical process enabled a comprehensive examination of the relationship between motivation and performance using both profile-based and variable-based approaches, thereby enhancing the reliability of the findings. Given the imbalance in gender distribution, gender was not treated as an analytical variable in this study in order to avoid statistically unreliable comparisons.

4. RESULTS AND DISCUSSION (SONUÇLAR VE TARTIŞMA)

4.1. Descriptive Statistics and Reliability

Analysis (Tanımlayıcı İstatistikler ve Güvenilirlik Analizi)

Cronbach's alpha coefficients were used to assess the reliability of the MDWMS subscales (Table 2). The Cronbach's alpha coefficient for the

autonomous motivation, controlled motivation, and amotivation subscales were 0.76, 0.69, and 0.79, respectively. Accordingly, the results indicate that the subscales of the scale are acceptable within the scope of the study and possess a good level of reliability.

It was observed that employees' levels of autonomous motivation were quite high (5.41). This result indicates that employees perform their work largely based on personal interest, values, and intrinsic satisfaction. The level of controlled motivation, on the other hand, was found to be medium-high (4.77). This suggests that external factors also influence employee performance. In contrast, the level of amotivation was quite low (1.68). This result indicates that employees generally do not experience unwillingness or meaninglessness in their work. The average performance index for the employees was 94.14%. This value indicates that employees at the participating furniture manufacturing facilities generally demonstrated normal performance levels.

Table 2. Descriptive Statistics of Study Variables (Çalışma Değişkenlerinin Tanımlayıcı İstatistikleri)

Variable	Mean	Std. Dev.	Minimum	Maximum	Cronbach's α
Amotivation	1,68	0,94	1	4,33	0.79
Autonomous	5,41	0,99	3	7	0.76
Controlled	4,77	0,99	2,36	6,67	0.69
Performance index (%)	94,14	15,90	65,67	127,50	-

4.2. Correlations (Korelasyonlar)

The results of the Pearson correlation analysis examining the relationships between the motivation dimensions and employee performance are presented in Table 3. The results revealed significant relationships between motivation dimensions and performance. There was a strong negative correlation between amotivation and performance ($r = -0.635$). This result indicates that as employees' feelings of unwillingness or meaninglessness towards their work increase, their performance decreases significantly. In contrast, a moderate positive relationship was found between autonomous motivation and performance ($r = 0.423$). This finding suggests that when employees perform their work in line with internal motivation and personal values, it positively impacts their performance. Similarly, a moderate positive relationship was identified between controlled motivation and performance ($r = 0.404$). This result indicates that employees' motivation based on external factors (rewards, job security, managerial expectations, etc.) can enhance performance.

When examining the relationships among the dimensions of motivation, a weak positive correlation was observed between autonomous and controlled motivation (0.208). This suggests that employees in the furniture industry may simultaneously experience both intrinsic and extrinsic sources of motivation. However, the relationships between amotivation and the other dimensions of motivation are weak. The findings indicate that employee performance is significantly influenced by motivation structure. In particular, the strong negative effect of amotivation on performance is noteworthy. However, it is also observed that autonomous and controlled motivation are factors that support performance. These results align with the SDT framework, which explains the relationship between work motivation and employee performance [1,3,16].

Table 3. Correlation Matrix (Korelasyon Matrisi)

Variable	1	2	3	4
Amotivation	1			
Autonomous	-0.196	1		
Controlled	-0.031	0.208	1	

Performance	-0.635	0.423	0.404	1
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4.3. Cluster Analysis (Kümeleme Analizi)

A two-stage clustering analysis was conducted to determine whether employees' motivation structures were homogeneous and whether distinct motivation profiles had emerged. In the first stage, hierarchical clustering analysis was performed using the Ward method and the Euclidean distance metric to identify natural groupings within the dataset. The resulting dendrogram shows that employees are clustered into two distinct groups based on their motivational characteristics (Figure 2). In line with this finding, K-means clustering analysis was applied in the second stage, and employees were divided into two distinct motivational profiles. As shown in Table 4, 32 employees were included in the first cluster and 15 in the second. This distribution indicates that a large portion of the sample exhibits similar motivational characteristics, whereas a smaller group is distinctly different.

To better understand the structure of the clusters, the cluster centers derived from the standardized variables were examined (Table 5). The results revealed a distinct differentiation between the two

clusters, particularly in terms of amotivation levels. While the amotivation levels of employees in the first cluster were lower than average, their autonomous and controlled motivation levels were higher than average. In contrast, employees in the second cluster exhibited high levels of amotivation and low levels of motivation. The clusters are characterized in Table 6, considering this differentiation. Accordingly, the first cluster was defined as the "high motivation profile," and the second cluster as the "low motivation profile." Figure 3 visually illustrates this profile distinction. Employees with a high motivation profile are particularly prominent in the autonomous motivation dimension, whereas those with a low motivation profile exhibit higher levels of amotivation. These findings reveal that employees do not possess a uniform motivation structure; rather, two distinct motivation profiles differ markedly from each other. This finding supports the multidimensional nature of employee motivation and provides an important foundation for understanding performance differences among employees.

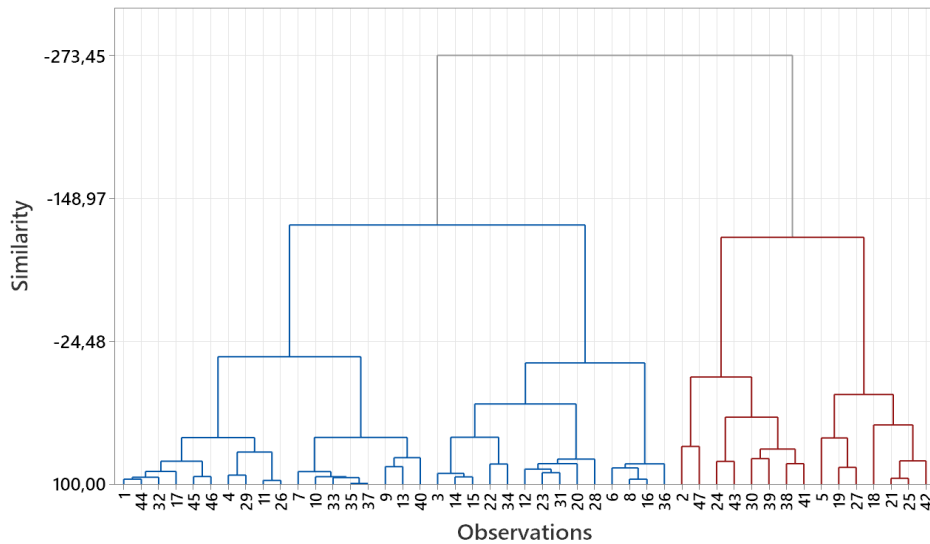


Figure 2. Dendrogram of Hierarchical Cluster Analysis (Hiyerarşik Kümeleme Analizi Dendrogramı)

Table 4. Cluster Sizes (Küme Büyüklükleri)

Cluster	Number of Employees
Cluster 1	32
Cluster 2	15

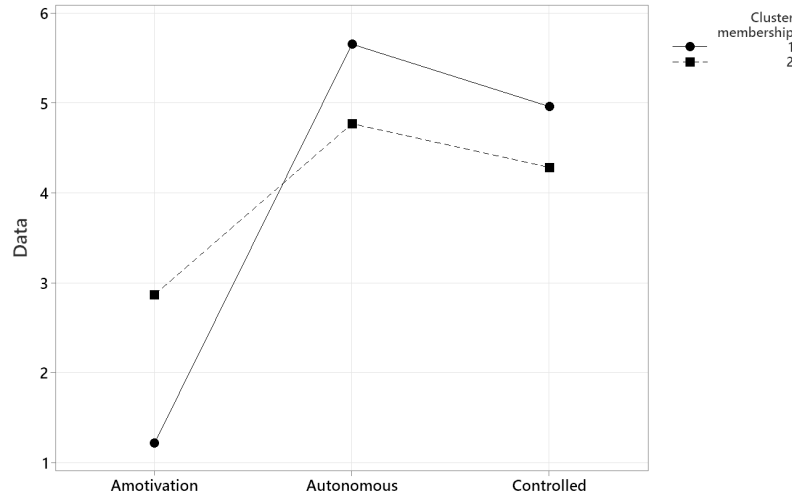
Table 5. Cluster Centroids (Standardized Values) (Küme Merkez Noktaları (Standartlaştırılmış Değerler))

Variable	Cluster 1	Cluster 2
Amotivation	-0.48	1.27

Autonomous	0.24	-0.64
Controlled	0.18	-0.49

Table 6. The motivation profiles of employees (Çalışanların motivasyon profilleri)

Cluster	Profile
Cluster 1	High Motivation
Cluster 2	Low Motivation

**Figure 3.** Motivational profiles of employees identified through cluster analysis (Kümeleme analizi yoluyla belirlenen çalışanların motivasyon profilleri)

4.4. Performance Comparison (Performans Kıyaslama)

An independent samples t-test was conducted to examine the effects of motivation profiles on employee performance. The results are shown in Table 7.

Table 7. Performance Comparison Between Clusters (Kümeler Arası Performans Karşılaştırması)

Cluster	Mean Performance	Std. Dev.
High motivation profile	100.8	12.9
Low motivation profile	76.7	7.5

$t = 7.90$; $p < 0.001$

An examination of Table 7 reveals a distinct difference in performance between the two motivation profiles. The average performance score for employees with a high motivation profile was 100.8%, while that for those with a low motivation profile was 76.7%. This difference was statistically significant ($t = 7.90$; $p < 0.001$). Accordingly, employees with high motivation levels in the furniture industry demonstrate significantly higher performance in the production processes. This finding demonstrates that the motivation profiles identified in the cluster analysis are not merely theoretical distinctions but are also directly related to actual performance outcomes. In particular, high levels of amotivation among employees with a low motivation profile are among the key factors

explaining the decrease in performance. The results reveal that employee motivation is not merely a psychological variable but also a critical factor determining production performance.

4.5. Regression Analysis (Regresyon Analizi)

A multiple linear regression analysis was conducted to determine the relationship between motivation dimensions and employee performance. The results of the analysis are presented in Table 8.

Table 8. Regression Analysis Results (Regresyon Analizi Sonuçları)

Predictor	Coefficient	p-value
Amotivation	-9.79	<0.001
Autonomous	3.87	0.021
Controlled	5.38	0.001
$R^2 = 60.37\%$		

Model:

$$\text{Performance} = 64.0 - 9.79(\text{Amotivation}) + 3.87(\text{Autonomous}) + 5.38(\text{Controlled})$$

An examination of the model's explanatory power revealed that the motivation dimensions accounted for 60.37% of the variation in employee performance. An analysis of the coefficients shows that amotivation has a strong, negative effect on performance. Accordingly, a one-unit increase in amotivation results in a decline of approximately 9.79 points in performance. This finding

demonstrates that amotivation is the variable that most significantly influences employees' performance. In contrast, autonomous motivation had a positive and significant effect on performance. This result indicates that when employees perform their work in accordance with their internal motivation and personal values, their performance improves. Similarly, it was determined that controlled motivation has a significant and positive effect on performance. This indicates that external motivational factors also play a supporting role in production performance. Regression analysis revealed that employee performance is significantly explained by the multidimensional structure of motivation. In particular, the strong negative effect of amotivation indicates that employees' perceptions of disinterest and meaningless work are critical to their performance. Additionally, it was determined that both autonomous and controlled motivation have performance-enhancing effects. These findings highlight the distinct and complementary effects of different types of motivation on employee performance.

4.6. Role-Based Differences in Motivation and Profile Distribution (Motivasyon ve Profil Dağılımında Rol Temelli Farklılıklar)

An independent samples t-test was conducted to examine differences in motivation between operational workers and employees in supervisory/technical roles within the production environment. The results are presented in Table 9. Additionally, motivation profile distributions were analyzed to examine role differences more comprehensively (Table 10).

Table 9. Comparison of Motivation Dimensions by Role (Motivasyon Boyutlarının Rol Bazında Karşılaştırılması)

Variable	Operational Workers (Mean)	Supervisory/ Technical Roles (Mean)	t	p
Amotivation	1.77	1.30	2.08	0.04
Autonomous	5.39	5.48	-0.21	0.83
Controlled	4.79	4.72	0.19	0.85

Table 10. Distribution of Employees Across Motivation Profiles by Role (Motivasyon Profillerine Göre Çalışanların Rollere Dağılımı)

Profile (Cluster)	Operational Workers (n=38)	Supervisory/ Technical Roles (n=9)
High Motivation	25 (%66)	7 (%78)
Low Motivation	13 (%34)	2 (%22)

The results of the independent samples t-test indicate a statistically significant difference between the groups in terms of levels of amotivation ($t = 2.08$, $p < 0.05$). Accordingly, the amotivation levels of operational workers are higher than those of employees in supervisory/technical roles. In contrast, no significant difference has been found in the autonomous and controlled motivation dimensions ($p > 0.05$). In support of these findings, an examination of the distribution of motivation profiles reveals that employees in supervisory/technical roles are represented at a higher rate (78%) within the high motivation profile, whereas this rate is lower (66%) among operational workers. On the other hand, operational workers are more heavily represented within the low motivation profile.

5. CONCLUSION (SONUÇ)

This study examines the effect of employee motivation on production performance in the furniture industry. The findings revealed a strong relationship between motivation profiles and performance. The cluster analysis results indicate that employees can be categorized into two distinct motivation profiles. The fact that employees with a high motivation profile exhibit significantly higher performance levels demonstrates the impact of motivation on performance. This can be explained by the fact that employees in the group with high autonomous motivation assign greater meaning to their work, internalize their tasks, and consequently perform better. Internally motivated employees not only fulfill their tasks but also participate more actively in work processes, which is reflected in their performance outcomes.

The findings are largely consistent with SDT. According to SDT, autonomous motivation is a fundamental source of motivation that enhances individual performance; conversely, amotivation negatively affects performance. In this study as well, the strong negative effect of amotivation on performance was confirmed through both correlation and regression analyses. This indicates that developing a sense of meaning and purpose in work is critical to performance. Controlled motivation also positively affects performance. This result indicates that external motivational factors (such as wages, job security, and managerial expectations) play a significant role in production environments. The findings of this study reveal that external incentives alone are insufficient to improve employee performance sustainably; internal motivation must also be supported.

Analyses examining role differences within the production environment provide important insights into the motivation-performance relationship. The findings indicate that employees in supervisory/technical roles exhibit significantly lower levels of amotivation compared to operational workers, while no significant difference was found in the dimensions of autonomous and controlled motivation. Additionally, a distribution analysis of motivation profiles reveals that employees in supervisory/technical roles are more highly represented within the high motivation profile, while operational workers are more highly represented within the low motivation profile.

In this study, SDT predictions have been empirically supported in the manufacturing sector. In particular, the strong negative effect of amotivation on performance and the positive contribution of autonomous motivation confirm the validity of the theoretical framework. Furthermore, the profile-based approach used in this study highlights the importance of evaluating motivation not merely through individual variables but through employees' holistic motivational structures. This approach reveals that employees may have different combinations of motivations, and these combinations can lead to different performance outcomes. In this study, measuring performance with objective data rather than subjective evaluations ensures that findings regarding the motivation-performance relationship are based on a stronger, more reliable basis.

Although the study's findings were evaluated solely within the scope of the businesses examined, it offers important insights for small and medium-sized enterprises with similar production structures. It is clear that focusing solely on external incentives, such as salary increases, is insufficient for improving employee performance. Developing practices that enable employees to find meaning in their work is of great importance. In this context, it may be beneficial to restructure job design to support employees' sense of autonomy. Providing employees with greater influence in decision-making processes and ensuring they have more control over work processes can increase autonomous motivation. Finally, managers who give greater importance to employee feedback and create a supportive work environment play a critical role in ensuring the sustainability of motivation.

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DECLARATION OF ETHICAL STANDARDS (ETİK STANDARTLARIN BEYANI)

The ethics committee report of this study was issued from "Karabük University Ethics Committee for Research in the Social and Human Sciences" dated 30/05/2025, number 2025/05(75).

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AUTHORS' CONTRIBUTIONS (YAZARLARIN KATKILARI)

Erkan Sami KÖKTEN: Methodology development, data collection, data analysis, manuscript writing, proofreading, and analysis of the results

Metodoloji geliştirme, veri toplama, veri analizi, makale yazımı, düzeltme okuması ve sonuçların analizi

Sudenaz YILMAZ: Literature review, data collection, proofreading, and text editing

Literatür taraması, veri toplama, düzeltme okuması ve metin düzenleme

Doğuhan ASLAN: Literature review, data collection, proofreading, and text editing

Literatür taraması, veri toplama, düzeltme okuması ve metin düzenleme

CONFLICT OF INTEREST (ÇIKAR ÇATIŞMASI)

The authors declare that they have no known conflicts of interest or personal relationships that could influence the work reported in this paper.

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