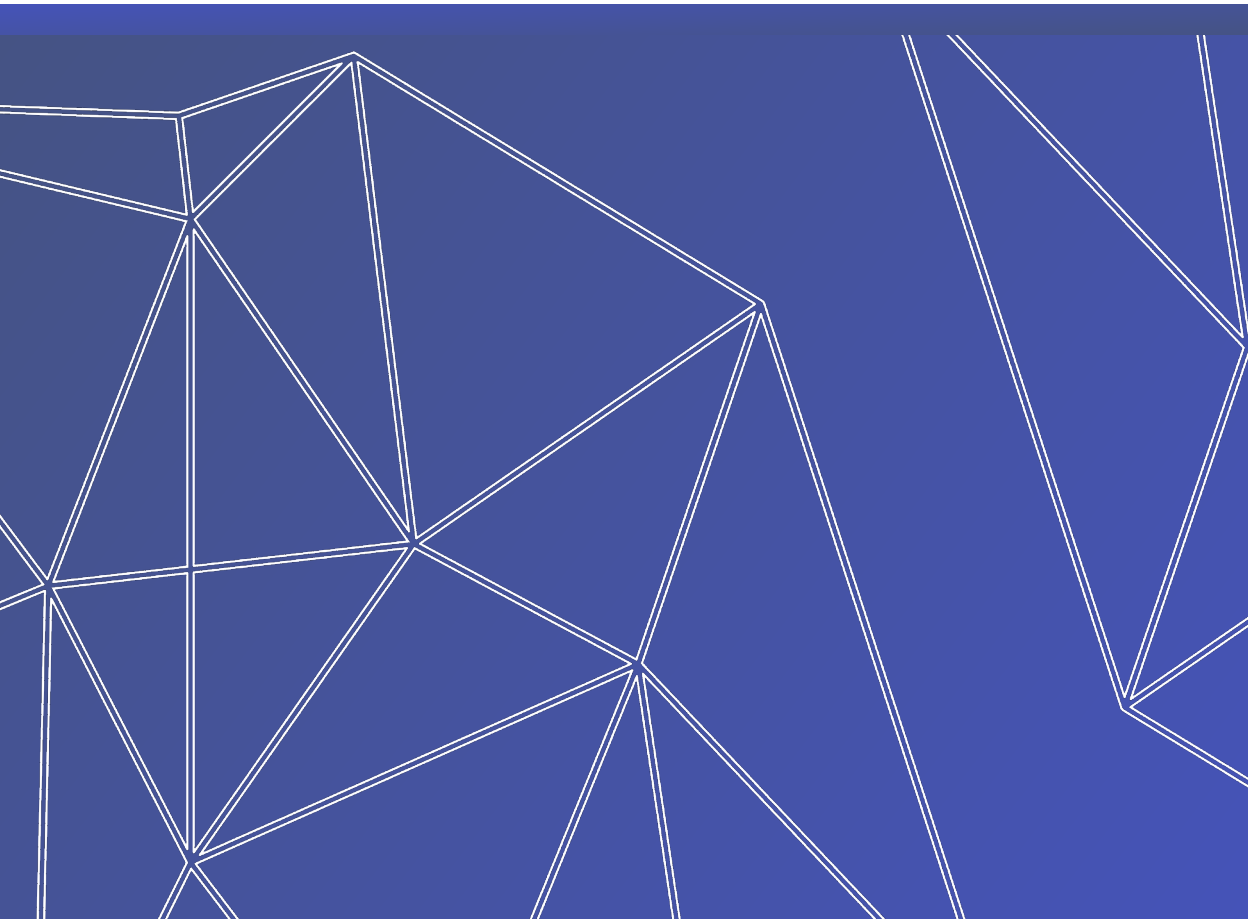
Proceedings of the XXXth International online conference Research for Furniture Industry

22–23 September 2022 Poznań, Poland



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Effective factors in the selection of furniture hardware and alternative approaches on preference priority

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Keywords

furniture hardware
hinge system
drawer system
lift-up door system

Abstract

As can be seen from the developments in the world furniture sector, in this study, the selection and use of furniture hardware, which play an important role in providing a competitive advantage in both the production and marketing of furniture, are examined, the important factors in the selection of furniture hardware are determined and their effects on the priority of preference are tried to be revealed. In this context, a survey study was conducted on small and medium-sized businesses to determine the effects of the factors that are important in selecting hardware on the preference priority. In determining the effects on preference priority, an evaluation method was followed based on the nature of the enterprises (being a manufacturer or supplier) and the status of the hardware on a product basis. As a result, it has been determined that the product-based features of the hardware differ with the structural nature of the enterprises in the preference priority in the selection and use of hardware. In this framework, alternative approach suggestions have been developed for the furniture industry for the choice of hardware.

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Introduction

As can be seen from the developments in the world furniture sector, in this study, the selection and use of furniture accessories, which play an important role in providing a competitive advantage in both the production and marketing of furniture, are examined, the important factors in the selection of furniture accessories are determined, and their effects on the preference priority are tried to be revealed. This study is based on the M.Sc. titled “The importance of hardware in furniture production and determination of the criteria in the selection of furniture hardware“, conducted at Istanbul University-Cerrahpasa Institute of Graduate Studies Department of Forest Industry Engineering.

Prepared using thesis data furniture accessories, which gain more and more importance in the furniture industry with the effect of global trends, play an important role in increasing the added value by contributing to the furniture's originality, functionality and aesthetic features. On the other hand, as can be clearly seen from the developments in the world furniture market and literature studies, the selection and use of furniture accessories emerge as the most important factor in providing competitive advantage. For example, a piece of furniture can be presented to the market as a new model and design by changing only one accessory (Dilik and Erdinler, 2003; Kılıç, 2021; Kurtoğlu and Dilik, 2020).

In terms of the research subject (production, marketing, materials, standardization-measures, variety, etc.), it consists of a very wide field of study, and the scope of the study is limited due to the method to be applied in the research. The scope of the study is limited to the determination of user and producer-oriented criteria in the selection of accessories for furniture and the development of proposals to increase the level of international competition in this field.. Considering the development level of the world accessory market, the furniture accessories industry in our country provides a similar development in terms of technological development, but it is insufficient in terms of product diversity. This situation emerges as an important constraint in the selection of accessories for both the user and the manufacturer. On the other hand, the differentiations in the changing lifestyle with the developing technology are rapidly changing the expectations from the furniture used in all areas of daily life. We can summarize the main effects of the trends that develop depending on the lifestyle on the furniture industry as follows. (Kurtoğlu and Dilik, 2019).

- The birth and spread of modern electro-furniture equipped with technology as a necessity of modern life.
- With the effects of smart housing and green building formations, smart furniture and environmentally friendly furniture applications are more common.
- The rapid increase in the share of modular furniture in the world market, which increases the quality of life, provides ease of use, is human and environmentally friendly, light, functional, easily portable, depending on the understanding of urbanization and rapidly increasing housing.
- More involvement of suppliers in the design process, suppliers with different fields of expertise (such as furniture, electronics, information technology, accessories, etc.) gaining importance.
- Increasing importance of furniture waste with the recycling issue.

As a result of the reflection of nanotechnology applications on the material, the use of dirt and stain-proof fabrics, leathers, environmentally friendly sponges, paints and varnishes is rapidly becoming widespread.

Classification of furniture accessories

It is seen that the classification for the accessory sector, which is expanding its product range day by day, was made by Dilik (1992) for the first time in our country, as shown in Table 1. However, apart from this classification, it is seen that today, for this purpose, most accessory manufacturers prefer catalog studies that introduce their product ranges by making a classification that groups different models of the product groups belonging to the same product. It is possible to say that this is one of the main problems in collecting sectoral data and reaching accurate statistical information.

Table 1. Classification of Furniture Accessories (Dilik, 1992)

Accessory group	Varieties
1 – Hinges	a) door and window hinges
	b) furniture hinges
2 – Door, window and furniture sliding sets	a) slides and rollers
	b) chains, scissors, stoppers
3 – Handles	a) door and window handles
	b) furniture handles
4 – Closing devices (lock, latch and keys)	a) door locks and latches
	b) window locks and latches
	c) furniture locks and latches
5 – Fixing and connecting elements	a) wood screws, nails and bolts
	b) plastic fasteners
	c) pullers
	d) corner bar and reinforcement elements
6 – Underfoot mechanism	a) castors, roulette and balls
	b) capsules, hobnails and bracelets
	c) base legs etc. underfoot mechanisms
7 – Other accessories and equipment	a) capsules, pins
	b) snaps, clips
	c) hanger elements
	d) hooks

General Factors Affecting The Selection of Furniture Accessories

Based on the literature studies examined within the scope of the research, the general factors affecting the selection of furniture accessories were determined as shown in Table 2 (Kılıç, 2021; Kurtoğlu and Dilik, 2020; Url 1; Url 2; Url 3; Url 4; Url 5; Url 6).

Table 2. General factors affecting furniture accessory selection (Kılıç, 2021)

1. Brand awareness
2. Affordability
3. Furniture type
4. Quality certificates
5. Furniture trend
6. Supply chain management
7. Warranty period
8. Loading capacity
9. Delivery time
10. Color
11. Integration program used

Product-based factors affecting the selection of furniture accessories

For this purpose, the factors that are effective on the product basis in the selection of furniture accessories examined within the scope of the research were determined as shown in Table 3, based on the technical specifications specified and recommended by the accessory manufacturers.

These factors have been tried to be explained by classifying them for 3 different product groups as Hinge Systems, Door Systems and Drawer Systems (Url 1; Url 2; Url 3; Url 4; Url 5; Url 6).

Table 3. Factors affecting furniture selection on a product basis (Kılıç, 2021)

A. Factors affecting hinge selection	B. Factors affecting the choice of lift-up door system	C. Factors affecting the choice of drawer systems
1. Door weight	1. Door weight	1. Drawer opening type
2. Door tyhickness	2. Cabinet body depth	2. Loading capacity
3. Soft closing effect and structure	3. Door opening type	3. Mounting type
4. Hinge opening angle	4. Function type	4. Function type
5. Door opening angle	5. Electrical opening assist	5. Color
6. Handleless door usage	6. Adjustment feature	6. Side wall thickness
7. Overlay distance	7. Easy assembling	7. Type of machine used
8. Color	8. Packing type	8. Place of use
9. Hinge drilling machine axis spacing	9. Color	9. Coating type
10. Type of machine used		10. Adjustment feature
11. Mounting plate type		11. Metal side height
12. Adjustment feature		12. Cabinet body design
13. Type of packaging		
14. Cabinet body design		

Methods and materials

The subject of this research is the examination of the factors affecting the selection of furniture accessories, which have an impact in every field, from the design of the furniture to the production, from the functionality to the marketing, and the examination of alternative approaches to determine their effects on preference priority. In this context, the data of the Master's thesis on Istanbul-Modoko Industrial Zone companies have been evaluated, taking into account both their production capacity and market shares, in order to ensure that they represent the accessory industry to a large extent. 163 out of 350 registered companies participated in this thesis study, which was carried out in Modoko Industrial Site, which includes many companies that produce furniture in every style (classic-modern) and make custom designs.

The survey content applied in the study was planned to determine the factors affecting the selection of accessories, both in general and on a product basis, and it was aimed to reveal the effects of the structural features and activity areas of the enterprises on these factors. In the analysis of the findings obtained in this context, the statistical package program SPSS 25.0 was used. In order to determine the level of difference between the groups in the analysis of the data, the Kruskal Wallis test was applied because the dependent variable was at the classification level. The results were evaluated with a 95% confidence interval and a significance level of $p < 0.5$.

Results and discussion

Findings on the structural features of the businesses participating in the research

The distribution of the enterprises participating in the survey applied in the research, according to their fields of activity, was determined as shown in Table 4. Accordingly, 63.2% of the companies are manufacturers, 27% are manufacturers and suppliers, and 9.8% are suppliers.

Table 4. Examining the distribution of companies in their fields of activity (Kılıç, 2021)

Area of activity	Number (N)	Percent (%)
Manufacturer	103	63.2
Supplier	16	9.8
Manufacturer and	44	27.0
Total	163	100

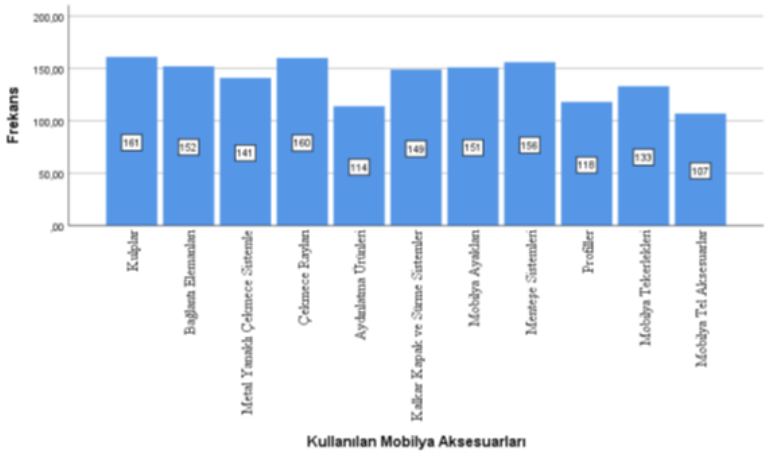

Fig. 1. Distribution of accessories used by companies in furniture (Kılıç, 2021)

As stated in the literature research, it is seen that furniture accessories have a wide variety of types and models, and this product range is increasing day by day. In the research, within the scope of the question asked to determine the most used furniture accessories in furniture, the most used accessories and their distribution ratios were determined as shown in Fig. 1. Accordingly, the most used and prominent accessories by furniture companies are respectively; Handles (10.4%), drawer slides (10.3%), hinge systems (10.1%), connecting fittings (9.9%), furniture legs (9.8%), lift and sliding systems (9.7%), profiles (7.7%), lighting products (7.4%), furniture wire accessories (6.9%) and furniture wheels (5.6%).

Findings on factors in general impact on accessory selection

For this purpose, the companies participating in the survey were classified according to their fields of activity and evaluated separately.

The distribution ratios of the importance levels of the expectations of the companies that participated in the research and whose field of activity is manufacturer, from furniture accessories were determined as shown in Table 5. Accordingly, a large part of the manufacturing companies are “Lifetime and warranty period” (44.7%), “Originality and image” (39.8%), “Price” (38.8%), “Functionality” (36.9%), “Aesthetic properties” (32%) stated their expectations as the most important. A large part (25.2%) stated that it is important to the expectation level of the manufacturers, whether it is imported or domestic.

Table 5. Distribution of importance levels for manufacturers' expectations from accessories (%) (Kılıç, 2021)

Factors	Most important	Important	Sufficient	Medium	Insignificant	Very unimportant	Total
Price *n*	40	22	7	5	8	21	103
	38.8	21.4	6.8	4.9	7.8	20.4	100.0
Functionality *n*	38	22	10	4	16	13	103
	36.9	21.4	9.7	3.9	15.5	12.6	100.0
Aesthetic *n*	33	15	15	21	9	10	103
	32.0	14.6	14.6	20.4	8.7	9.7	100.0
Life and warranty period factor *n*	46	22	8	8	10	9	103
	44.7	21.4	7.8	7.8	9.7	8.7	100.0
Imported or local product status	25	26	17	7	13	15	103
	24.3	25.2	16.5	6.8	12.6	14.6	100.0
Originality and image *n*	41	18	11	5	12	16	103
	39.8	17.5	10.7	4.9	11.7	15.5	100.0

The distribution ratios of the importance levels of the expectations from the furniture accessories of the suppliers, which are the field of activity in the research, were determined as shown in Table 6. Accordingly, most of the supplier companies expect "Originality and image" (49.8%), "Aesthetic properties" (43.8%), "Price" (37.5%), "Functionality" (37.5%), "Imported or local product status" (37.5%) as the most important factors. It is seen that the level of expectation for the service life and warranty period factor is stated as the most important and very unimportant by a large part of the companies (37.5%).

Table 6. Distribution of importance levels for the expectations of suppliers from accessories (%) (Kılıç, 2021)

Factors	Most Important	Important	Sufficient	Medium	Insignificant	Very unimportant	Total
Price *n*	6	1	2	1	1	5	16
	37.5	6.3	12.5	6.3	6.3	31.3	100.0
Functionality *n*	6	2	–	2	2	4	16
	37.5	12.5	–	12.5	12.5	25.0	100.0
Aesthetic properties *n*	7	–	3	–	2	4	16
	43.8	–	18.8	–	12.5	25.0	100.0
Life and warranty period factor	6	2	1	1	–	6	16
	37.5	12.5	6.3	6.3	–	37.5	100.0
Imported or local product status	6	5	1	–	1	3	16
	37.5	31.3	6.3	–	6.3	18.8	100.0
Originality and image *n*	8	3	1	–	1	3	16
	49.8	18.8	6.3	–	6.3	18.8	100.0

The distribution ratios of the importance levels of the expectations from the accessories of the enterprises, whose field of activity in the research is both manufacturer and supplier, were determined as shown in Table 7. Accordingly, the importance levels of these companies' expectations from accessories are respectively; "Originality and image" (40.9%), "Functionality" (38.6%), "Aesthetic properties" (36.4%), "Lifetime and warranty period" (36.4%), "Imported or local product status" (34.1%), "Price" (29.5%).

Table 7. Distribution of importance levels for the expectations of manufacturers and suppliers from accessories (%) (Kılıç, 2021)

Factors	Most important	Important	Sufficient	Medium	Insignificant	Very unimportant	Total
Price *n*	13	9	5	2	3	12	44
	29.5	20.5	11.4	4.5	6.8	27.3	100.0
Functionality *n*	17	7	2	2	5	11	44
	38.6	15.9	4.5	4.5	11.4	25.0	100.0
Aesthetic properties *n*	16	4	5	3	3	13	44
	36.4	9.1	11.4	6.8	6.8	29.5	100.0
life and warranty period factor	16	5	3	5	3	12	44
	36.4	11.4	6.8	11.4	6.8	27.3	100.0
Imported or local product status	15	4	3	7	5	10	44
	34.1	9.1	6.8	15.9	11.4	22.7	100.0
Originality and image *n*	18	5	–	3	2	16	44
	40.9	11.4	–	6.8	4.5	36.4	100.0

Findings on factors in product basis on accessory selection

In the research, it has been tried to determine whether the demand of the furniture sector from the accessory sector in terms of product group and variety is met at sufficient quality and quantity.

For this purpose, the factors affecting the selection of accessories on a product basis; It has been determined over 3 different accessory groups selected as Hinge systems, Drawer systems and Lift-Up door systems.

The findings obtained in this context are shown in Table 8. Accordingly, the rates of meeting the sectoral demand at a sufficient quality level were determined as "very good" in Drawer systems (77.9%), Hinge systems (76.1%) and Lift Up Door systems (62%).

In the research, the findings regarding the situation of meeting the sectoral demand in quantity (quantity) are shown in Table 9. Accordingly, the ratios of meeting the sectoral demand in terms of quantity (quantity) were determined as "very good" in Drawer systems (76.7%), Hinge systems (76.7%) and Lift up Door systems (66.9%).

Table 8. The ratio and distribution of the companies' demand from the accessory sector at a sufficient quality level on a product basis (Kılıç, 2021)

Quality	Hinge system		Drawer system		Door system	
	n	%	*n*	%	n	%
Very bad	–	–	–	–	1	0.6
Bad	–	–	1	0.6	8	4.9
Neutral	6	3.7	9	5.5	14	8.6
Good	33	20.2	26	16.0	39	23.9
Very good	124	76.1	127	77.9	101	62.0
Toplam	163	100.0	163	100.0	163	100.0

Table 9. The ratio and distribution of the companies' demand from the accessory sector in terms of quantity (quantitative) on a product basis (Kılıç, 2021)

Quality	Hinge system		Drawer system		Door system	
	N	%	N	%	N	%
Very bad	–	–	–	–	–	–
Bad	2	1.2	1	0.6	5	3.1
Neutral	5	3.1	5	3.1	10	6.1
Good	31	19.0	32	19.6	39	23.9
Very good	125	76.7	125	76.7	109	66.9
Toplam	163	100.0	163	100.0	163	100.0

Findings on the effect of business activity field on accessory selection

In the research, the findings obtained to reveal the effects of the enterprises' structural features and activity areas on the factors affecting the selection of accessories are shown in Table 10.

businesses according to their fields of activity, classified according to their status as manufacturer, supplier and both manufacturer and supplier. In this context, the data obtained on the factors affecting the selection of accessories are shown in a comparative manner.

When Table 10 is examined, it has been revealed that the importance levels of the business activity area on the factors affecting the selection of accessories differ. For example; While there is no significant difference in terms of brand awareness, economy, furniture type, quality certificates, furniture trend, Supply Chain Management, warranty period, Loading capacity, delivery time and color factors according to the fields of activity, it has been revealed that there are significant differences according to the fields of activity of the companies in the integration program used.

Table 10. Comparison of the effect of the business field of activity on the factors affecting the selection of accessories and their importance levels (Kılıç, 2021)

Factors affecting the selection	Activity class	*n*	Class average	X^2	*sd*	*P*
Brand awareness	– manufacturer	103	77.41	4.350	2	0.114
	– supplier	16	92.78			
	– manufacturer and supplier	44	88.83			
Economy	– manufacturer	103	81.95	0.231	2	0.891
	– supplier	16	77.81			
	– manufacturer and supplier	44	83.64			
Furniture type	– manufacturer	103	78.79	4.118	2	0.128
	– supplier	16	73.38			
	– manufacturer and supplier	44	92.65			
Quality certificates	– manufacturer	103	79.67	1.991	2	0.370
	– supplier	16	77.25			
	– manufacturer and supplier	44	89.18			
Furniture trend	– manufacturer	103	79.31	2.378	2	0.305
	– supplier	16	76.50			
	– manufacturer and supplier	44	90.31			
Supply chain management	– manufacturer	103	82.34	1.064	2	0.587
	– supplier	16	72.66			
	– manufacturer and supplier	44	84.60			
Warranty period	– manufacturer	103	80.85	0.477	2	0.788
	– supplier	16	79.63			
	– manufacturer and supplier	44	85.56			
Loading capacity	– manufacturer	103	78.53	5.220	2	0.074
	– supplier	16	70.16			
	– manufacturer and supplier	44	94.42			
Delivery time	– manufacturer	103	83.80	2.625	2	0.269
	– supplier	16	65.41			
	– manufacturer and supplier	44	83.82			
Colour	– manufacturer	103	79.46	1.078	2	0.583
	– supplier	16	90.59			
	– manufacturer and supplier	44	84.82			
Integration program used	– manufacturer	103	75.74	7.024	2	0.030*
	– supplier	16	81.44			
	– manufacturer and supplier	44	96.86			

Conclusions

As a result, it has been revealed that the importance levels of the factors affecting the selection of furniture accessories with a wide variety and wide product range differ. It is seen that the main reasons for these differences are the effect of world furniture trends, the technological features of accessories on a product basis, and the increasing

variety of types and models. In addition, it is seen that the structural feature of the enterprise and the field of activity affect the importance levels of the factors affecting the selection of accessories.

Within the scope of the research, the general factors affecting the selection of accessories; 1. Brand Awareness, 2. Affordability, 3. Furniture Type, 4. Quality Certificates, 5. Furniture Trend, 6. Supply Chain Management, 7. Warranty Period, 8. Loading Capacity, 9. Delivery Time, 10. Color, 11. It has been determined as the Integration Program used. It has been determined that the importance levels of these factors in the selection of accessories vary according to the accessory type and product group. For example; While the factor of "Use life and warranty period" (44.7%) takes the first place in the ranking of the expectations and importance levels of the enterprises in the field of activity, in the selection of accessories, the first place in the expectation and importance levels of the enterprises in the position of Supplier in the selection of accessories is "Originality and image" (56%). It turns out that the factor, 3) is taking.

The factors affecting the selection of accessories on a product basis were determined as follows over 3 different product groups selected. It has been revealed that the importance levels and orders of these factors vary according to the field of activity of the enterprises, as in the general factors.

A. Factors affecting the selection of hinge systems:

1. Door weight, 2. Door thickness, 3. Braking effect and structure, 4. Hinge opening angle, 5. Door opening angle, 6. Handleless door usage, 7. Overlap distance, 8. Color, 9. Hinge drilling machine axis range, 10. Machine type used, 11. Mounting type, 12. Adjustment feature, 13. Packing type

B. Factors affecting the selection of drawer systems:

1. Drawer opening type, 2. Loading capacity, 3. Assembly type, 4. Function type, 5. Color, 6. Wood thickness, 7. Machine type used, 8. Place of use, 9. Coating type, 10. Adjustment feature, 11. Metal sidewall height, 12. Cabinet body design

C. Factors affecting the selection of Lift-Up Door Systems:

1. Door weight, 2. Cabinet body depth, 3. Door opening type, 4. Function type, 5. Electric opening support, 6. Adjustment feature, 7. Ease of assembly, 8. Packing type, 9. Color.

As a result; As can be seen from the developments in the world furniture sector, in this study, in which alternative approaches to the selection and use of furniture accessories, which have a large share in providing competitive advantage, are examined, the necessity and importance of defining the accessory selection criteria separately on a product basis by bringing together all the stakeholders in the sector has emerged.

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