Promoting fashion customer relationship management dimensions based on customer tendency to outfit matching: mining customer orientation and buying behaviour

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Abstract: The purpose of this study is to mining dimensions of customer relationship management (CRM) based on consumer tendency to outfit matching. Consumers are clustered into groups based on descriptive variables, consumer desire to outfit matching and customer relationship dimensions. According to the results of this research, female customers with the age 30 or younger, who have a bachelor degree and are single, are inspired to outfit matching and prefer customer involvement dimensions. Also, long-term partnership is the most significant dimensions of CRM for consumers who do not engage in outfit matching. Then, association rules were applied for extracting customer buying behaviour that influence customer tendency to outfit matching. These results can be useful for the fashion industry to apply
more effective CRM systems and customise them with customer’s preferences and behaviour analysis. Compared with traditional techniques, the data mining methods have great potential for investigating customers’ preferences.

**Keywords:** analysis behaviour; customer relationship management; CRM; data mining; fashion industry; match up clothing.


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1 Introduction

In recent years, the high level of competition has been one of the most difficult challenges in unpredictable markets. Due to the recent emergence of numerous retail options, the fashion market has become more competitive (Hui and Yee, 2015). Furthermore, products in the fashion industry may no longer be profitable or interesting to consumers when fashion trend change (Lee et al., 2015). For more than 60 years, the notion of impulse purchasing decisions has held the interest of both researchers of consumer behaviour and marketers (Liapati et al., 2015; Lee and Song, 2011). Under such a situation, one efficient way that firms usually adopt to differentiate themselves from their competitors is identifying customers’ wants and purchase behaviour (Michel et al., 2017). Understanding mentioned items could not be achieved without having valid segmentation of customers.
Customer relationship management (CRM) is one of the helpful tools that involved costumers’ orientations and preferences. It is difficult to recognise a universally agreed definition of CRM; CRM can be described as a comprehensive strategy and process of acquiring, retaining, and collaborating with loyal customers to create greater value for firms and customers. An effective and efficient CRM develops innovation capacity and provides a durable competitive advantage.

Moreover, one of the remarkable customer behaviour is match up clothing. Customers need to sort their clothes, keep track of all their garments and ensure that they never run out of new and interesting combinations.

Previous studies tried to find a helpful way to separate customers based on their behaviour and preferences (Wong and Wei, 2018; Chen et al., 2017). However, some key problems prevent previous behaviour analysis methods from achieving the full potential of understanding customers’ preferences. The complexity of finding appropriate variables could not be solved with traditional methods. Furthermore, in most of the studies, researchers used statistical techniques to extract customers’ true opinions is a challenging task.

So, the primary objective of this study is to provide a useful description of customer’s perspective by using data mining (DM) methods on external CRM dimension data and tendency to outfit matching.

Thus, the main questions of the present study in order to approximate the minds to the main subject of the study are as follows:

RQ1 What is the description of CRM dimensions in fashion industry?

RQ2 What is the relationship between CRM dimensions in fashion industry and customer tendency to outfit matching?

RQ3 How can we extract the rules between customer buying habits and customer attributes?

In order to find mentioned question, this study at first aims to demonstrate different type of customers based on customer tendency in CRM dimensions and outfit matching. Moreover, CRM dimensions were developed in accordance with customer tendency to outfit matching in fashion industry. Finally, in order to develop firm knowledge about customers, some hidden rules through common customer purchase habits were extracted. Thus, we need a powerful methodology that can find the answer of mentioned questions. Among the newly developed techniques, DM algorithms such as clustering and association rules have been applied for a successful segmenting and discovering hidden patterns in customers from large amounts of data stored in databases (Michel et al., 2017; Shokouhyar et al., 2017c; Li et al., 2018; David et al., 2019). It is an available way for design the most appropriate marketing strategies that may be used to reach the identified target segments and allocate marketing resource effectively (Altuna et al., 2013).

The main contribution of the study will help managers to know customers better than before and develop new product based on CRM dimensions and customer behaviour.

The remainder of this paper is organised as follows. Section 4 deals with the DM process, including clustering analysis, association rules and explain the results. Section 5 describes article implications and Section 6 is dedicated to managerial implications. Finally, conclusion, limitation and future research are considered in Section 7.
2 Literature review

This literature review was done to realise the contribution of existing works in order to differentiate this research from those studies.

2.1 Customer relationship management

There is no totally approved definition of CRM (Lipiäinen, 2015). It is an area that has been viewed from multiple approaches (e.g., technology, strategy, and philosophy) and different peoples’ perspectives. Also, it depends on context and other contingent factors (Dimitriadis and Steven, 2008; Piskar and Faganel, 2009). CRM can be described as a comprehensive strategy and process of acquiring, retaining, and collaborating with loyal customers to create greater value for firms and customers.

Firms adopt CRM system to gain different purposes such as enhancing relationship with customer and increasing customer loyalty (Coltman et al., 2011; Hosseini et al., 2010; Hillebrand et al., 2011); increasing the smooth flow of business processes (Elbeltagi et al., 2014), reducing marketing cost, and enhancing service quality (Tseng and Wu, 2014; Shokouhyar et al., 2017a, 2017b).

Moreover, many studies analysed CRM approach with some models and applications. RFM model is one of the helpful models because customer value can be reflected by the most recent consumption as the recency, the frequency in normal consumption, and the monetary cost of consumers in the model, frequency and monetary aspects of target customers (Song et al., 2017). Another research extends CRM to other applications and incorporates new analysis techniques (Neslin et al., 2013). For example, vendor relationship management combined with CRM for sale managers have become popular. Another study creates a new CRM analysis technique to the repeat purchase of automobiles (Kim and Kim, 2014).

2.2 CRM dimensions

CRM can be divided into internal and external categories (Lin et al., 2010; Shokouhyar et al., 2017a). Internal programs emphasise organisation structure, culture (Rahimi and Gunlu, 2016), and knowledge management (KM) (Hasanian et al., 2015), while external programs refer to interaction with customers.

This research focuses on external CRM programs. Five most popular activities include information sharing, customer involvement, long-term partnership, joint problem solving and technology-based CRM (Lin et al., 2010; Mohammad et al., 2013). These dimensions were used in previous studies and were accepted by experts because they are comprehensive and strongly related to the main components of CRM. These dimensions are summarised as follows:

2.2.1 Information sharing

It refers to the willingness of sharing and exchanging valid, reliable, sufficiently accurate, and relevant information through interactive activities between firms and their customers. The findings explained that trust is the most important antecedent for willingness to share, while the impacts of commitment and reciprocity are also significant. Interestingly, power is not a significant antecedent of willingness (Zaheer and Trkman, 2017).
This information is different in each market. However, the commonly shared information includes market demand, customer preferences, sales promotion, and new product introduction.

2.2.2 Customer involvement

It is related to customer participation and involvement during new product development (NPD) processing. Involvement refers to the face-to-face interactions in financial services in a narrow field of study (Fatima and Razzaque, 2013). Previous studies consider customer involvement to explain the variety of customer relationship. For instance, the effect of customer involvement was extracted from the relationship between customer expectations and satisfaction (Shokouhyar et al., 2018c). Interpreting and analysing the voice of the customer (VOC) could gain more reasonable outcome and success of a product or service in the world market. Also, it can affect relational benefits and contribution to purchasing financial products (Aguwa et al., 2017). Manufacturers who are more customer-oriented than their competitors allow customers to take part in market evaluation conferences, pricing systems discussions, and promotion activities, as well as forming retailing and marketing strategies (Lin et al., 2010).

2.2.3 Long-term partnership

One of the important purposes of customer-oriented behaviour is to increase long-term satisfaction and maintain loyal customers (Kim, 2008). Loyal customers prefer to repurchase the products of a brand and recommend the brand to others (Gee et al., 2008; Mohammad et al., 2013; Hui and Yee, 2015). Previous studies have shown that customers who are satisfied with their purchase experience tend to be loyal to the brand. The consumer compares the benefits that will be obtained from each product or service depending on a set of criteria and makes a decision for repurchasing (Peláez et al., 2018). Thus, building long-term partnership has a strong relationship with customer satisfaction and loyalty.

2.2.4 Joint solving problem

Joint solving problem is referred to the collaboration between manufacturers and customers to overcome difficulties, jointly responsibility, and solving problems in unexpected situations (Lin et al., 2010). Joint problem solving is considered as a key factor affecting the success of product and market development. Manufacturers equipped with sound joint problem-solving mechanisms are in a better position to provide after-sale services, resolve customer claims, and offer warranty and maintenance services. So, firms will experience fewer complaints, reduce their warranty costs, and in the process earn the loyalty of their customers (Aguwa et al., 2017; Arabi et al., 2018).

2.2.5 Technology-based CRM

A modern system of information communication technology can be used to reduce internal cost, better interaction with an environment, and increase economic profit in a long-term (Mohammad et al., 2013; Shokoohyar et al., 2019b, 2018). Also, it offers technical assistance to customers, including data storage, DM, and CRM software system. Using DM tools, some organisations are able to exploit insights gained from their
data warehouse to increase sales and offer new and better products or services to customers (Hwang and Xu, 2008; Lin et al., 2010).

2.3 CRM in fashion

Despite the importance of applying CRM systems in the fashion industry, a limited number of works have been conducted on the dimensions of CRM system in the fashion industry. Previous studies considered the customer preferences of fashion industry in buying behaviour (Rahman et al., 2014), investigated customer’s tendencies during fashion product development process (Lee et al., 2015), identified motivations for their fashion disposition and emotional response experienced during and after the fashion disposition process (Lee et al., 2013), and practiced three essential types of participants (i.e., textile designers, fashion designers, and fashion buyers) in product development (Goworek, 2010).

Although all these works focus on customer preferences, they did not investigate CRM dimensions in their studies. The following section develops the relationships between CRM dimensions and fashion industry as follows:

2.3.1 The relationship between information sharing and fashion industry

Customers want to know about market information, product demand, information inventory, and production plans for making a better decision.

Due to the speed of copying apparel design in the fashion industry (Watson and Yan, 2013), firms cannot share their information about inventory or new designing. So, market information and product demand were selected in this research.

2.3.2 The relationship between customer involvement and fashion industry

We need products in the fashion industry that are not only fashionable but also profitable in the market when fashion trends change. Thus, it is essential to apply DM techniques in order to understand customers’ purchasing behaviour (Lee et al., 2015).

Also, creating a facility for customers to customising products with their own needs is very important in the fashion industry. So, we set engaging in NPD and customisation as a significant factor of customer involvement.

2.3.3 The relationship between long-term partnership and fashion industry

Empirical studies in fashion industry demonstrate that loyal customers are likely to repurchase the products of a brand and recommend the brand to others (Hui and Yee, 2015).

Furthermore, customer satisfaction has a strong relationship with brand loyalty. In other words, having brand loyalty and trust are really important for customers. Thus, brand loyalty and trust are selected for this dimension (Su and Tong, 2016).

2.3.4 The relationship between Joint solving problem and fashion industry

This dimension is more significant for industries that produce expensive and high-tech products. Accordingly, this dimension is not very remarkable and we consider jointly
responsible and speed of responding factors in this research (Lee et al., 2015; Kumar et al., 2016).

2.3.5 The relationship between technology-based CRM and fashion industry

Providing real-time warehouse for producing real-time information about the fashion industry and brands is an important factor for customers.

To reach this goal, firms need an accessible space for put real-time information and knowledge. Thus, real-time warehouse and customer-based site are selected for this dimension (Kim and Martinez, 2012; Zhang et al., 2010).

2.4 Summing up

The literature review highlights some crucial issues. For some authors, studying CRM dimensions is a helpful way to find customer preferences. The importance of each dimension and developing CRM system depend on the customers’ preferences in each market. Also, each dimension can be measured by different factors. Previous studies and expert in fashion industry helped us to choose two effective factors for each dimensions.

In this way, all factors of CRM in the fashion industry were determined. The summary of these dimensions and their factors is provided in Table 1.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>External dimensions of CRM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>Factor 1</td>
</tr>
<tr>
<td>Information sharing</td>
<td>Information marketing</td>
</tr>
<tr>
<td>Customer involvement</td>
<td>NPD</td>
</tr>
<tr>
<td>Long-term partnership</td>
<td>Trust</td>
</tr>
<tr>
<td>Joint problem solving</td>
<td>Jointly responsible</td>
</tr>
<tr>
<td>Technology-based CRM</td>
<td>Real-time warehouse</td>
</tr>
</tbody>
</table>

According to the gap analysis of recent literature conducted by the authors, the major findings of the studied literature and contributions and objectives of this work are summarised as follow:

- Several works have defined the dimensions of CRM system. These dimensions have strong relationships with that studied industry and their customers. As a result, in this study, we try to examine some popular dimensions of CRM based on the customer of fashion.

- Due to the volume of data in the fashion industry and finding customers’ preferences, we need an efficient tool to extract valid and effective information and knowledge. DM algorithms are often designed to handle a large amount of data with multiple parameters. In addition to conducting many interesting studies for employing DM to investigate consumers’ perceptions and adoption behaviour, this
approach has been also extensively applied in many different fields as well as different products and services.

- There’s an extensive body of knowledge contributed to use of DM methods in CRM and customer behaviour. We focus on consumer tendency to outfit matching as a remarkable behaviour and try to find a relationship between CRM dimensions and this buying behaviour. This research can increase customer satisfaction and design more suitable CRM system.

3 Methodology

As it was mentioned in introduction, DM algorithms were implemented in this research. Statistics only lets you prove your observation (hypothesis) scientifically so that the community accept your hypothesis. On the contrary, DM is an exploratory tool. You have no idea about the hidden knowledge inside the data. DM lets you to ‘discover’ that invisible knowledge (Yu et al., 2017; Shokoohyar et al., 2018). Also the volume of data and attributes, do not let us to use statistical tools (Jothi et al., 2015).

The methodology starts with previous studies in CRM and fashion. Then the method of this article will be discussed.

3.1 DM in CRM

There’s an extensive body of knowledge contributed to use of DM methods in CRM. One study was established customers’ markets and rules of dynamic CRM systems for online retailers. The research methods aim at the supervised Apriori algorithm, C5.0 decision tree algorithm, and RFM model. The results discovered eight RFM markets and six rules of online retailers (Chiang, 2012). The objective of another research is to identify high-value markets by using the DM technologies and a new model. The fuzzy C-means algorithm is used to process the market segmentation of the customer benefit market. These rules can be applied to CRM systems for discovering useful and valuable markets (Chiang, 2013). Clustering and classification were used together so far. This paper is based on dedicated study of the literature present on the analytical CRM, KM and DM techniques (Ranjan and Bhatnagar, 2011; Shokoohyar, 2019, 2018).

3.2 DM in fashion

Over the past few decades, various investigators have developed research studies to explore fashion customer preferences and behaviour. These studies were carried out in different countries, using different samples and methods. DM algorithms are often used to discover hidden tendencies. Clustering techniques are one of the well-known DM algorithms. Some investigators developed these techniques to cluster the consumers into three groups (i.e., a fashion innovator, fashion follows, and laggard) and extracted association rules based on locations in order to understand customers’ preferences (Rahman et al., 2014). The other study was carried out in Portugal and identified fashion consumer profiles among young adults. A cluster analysis discovered three groups: Moderates, Apathetic and Enthusiasts (Cardoso et al., 2010). Cluster analysis revealed that four shopping segments described the female consumers in US. The segments were
named Decisive Apparel Shopper, Confident Apparel Shopper, Highly Involved, Apparel Shopper, and Extremely Involved Apparel Shopper based on several shopping factors (Moye and Kincade, 2003).

Furthermore, Association rules are useful algorithms in fashion. One study was applied the fuzzy association rule mining methodology to investigate customer’s preference in fashion product development. Their results show that the FARM approach can provide knowledge support to the fashion industry during NPD, shorten the NPD cycle time, and increase customer satisfaction (Lee et al., 2015).

This research employs a DM technique to investigate a multi-feature data set extracted from a questionnaire survey. Regarding to previous studies, clustering analysis and association rules were really helpful in CRM and fashion industry. Thus, we use DM algorithms in this research.

First, measures for the survey instrument were extracted from previous literature and modified to be suitable for the context of this study. The database was divided into four parts: customers’ descriptive data, CRM dimensions, customer preference to outfit matching and the last part belongs to the sores of customer habits for clothing purchasing.

### 3.3 Questionnaire and sampling

Given that we try to find more significant CRM dimensions through customer’s preferences, using questionnaire is the only way to collect data. In addition, this research tried to collect data as randomly as possible by putting the questionnaire on social media (Shokoohyar et al., 2018). Participants were chosen from Facebook and Instagram in Iran. These two social media are more popular in this country. A total of 900 samples were collected from social media on 1 December and 28 February of 2018–2019. Eventually, 854 of them were identified as valid.

As it was mentioned, the questionnaire was divided into four parts.

<table>
<thead>
<tr>
<th>Variable</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>Liao et al. (2010) and Sharon et al. (2015)</td>
</tr>
<tr>
<td>Gender</td>
<td>Koca and Koc (2016), Rahman et al. (2014) and Liao et al. (2010)</td>
</tr>
<tr>
<td>Education level</td>
<td>Liao et al. (2010) and Sharon et al. (2015)</td>
</tr>
<tr>
<td>Marital status</td>
<td>Srinivasan et al. (2015) and Liao et al. (2010)</td>
</tr>
</tbody>
</table>

The information for the first part includes age, gender, education level, and marital status. Previous studies have shown that these variables affect purchasing behaviour (Table 2).

The second part consists the scores of the customer-based factor analysis of CRM. As described in the literature review, each dimension was measured by two acceptable factors.

Internal consistency of the second part was measured by computing Cronbach’s coefficient alpha for each dimension (Table 3).

The third part was designed to find customers who match their clothing. Toward this goal, several valid questioners were studied and expert’s ideas were collected. Finally, nine questions were put in this part to evaluate the preference of customers in outfit matching (Table 4).
<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Factors</th>
<th>Questions</th>
<th>Cronbach’s coefficient alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information sharing</td>
<td>• Market information</td>
<td>• Acquiring information about fashion trend is so important.</td>
<td>0.710</td>
</tr>
<tr>
<td></td>
<td>• Product demand</td>
<td>• Transparency in market information is really significant in fashion industry.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Bestseller products are always attracting me.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• The information about product demand can helps me in purchasing.</td>
<td></td>
</tr>
<tr>
<td>Customer involvement</td>
<td>• Engaging in NPD</td>
<td>• I follow latest fashion products and designs.</td>
<td>0.836</td>
</tr>
<tr>
<td></td>
<td>• Customisation</td>
<td>• I’d like to follow all steps of producing new fashion products.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• My cloth is a part of who I am.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• My cloth shows my character</td>
<td></td>
</tr>
<tr>
<td>Long-term partnership</td>
<td>• Loyalty</td>
<td>• I’d like to buy clothes from my favourite stores.</td>
<td>0.716</td>
</tr>
<tr>
<td></td>
<td>• Trust</td>
<td>• I’m a big fan of some specific brands.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Products should align with the value and quality.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• I used to purchase clothes from well-known brands.</td>
<td></td>
</tr>
<tr>
<td>Joint problem solving</td>
<td>• Jointly responsible</td>
<td>• Guaranty and warranty are two significant factors.</td>
<td>0.816</td>
</tr>
<tr>
<td></td>
<td>• Speed of responding</td>
<td>• After sales service is so important to me.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Creating integrated responding system is necessary in fashion industry.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Order lead time is so important for me.</td>
<td></td>
</tr>
<tr>
<td>Technology-based CRM</td>
<td>• Real-time warehouse</td>
<td>• Brands should use the latest purchasing information through new designing.</td>
<td>0.711</td>
</tr>
<tr>
<td></td>
<td>• Customer-based site</td>
<td>• In my opinion, a modern store should pay attention to real-time RFM models.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• I follow fashion brand on social network site.</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Internet and site are my first considerations during purchasing clothes.</td>
<td></td>
</tr>
</tbody>
</table>

Outfit matching in stores persuades me to buy. My style and my clothing. The last part belongs to the scores of customer buying behaviour that influence customer tendency to outfit matching. Several remarkable purchase habits based on previous research and expert’s ideas were selected and the relationships were extracted.
Table 4  Item sample of statement about customer preference (alpha Cronbach= 0.7)

- When I purchase a new item, I buy a matching outfit item.
- Wearing a matching outfit items is very important for me.
- I follow the news and information about new fashion trends.
- I think about what I wear, before wearing it.
- I use accessories with my clothing.
- Using expert software for outfit matching is interesting for me
- I find fashion clothing a very relevant product in my life.

3.4 Clustering analysis

Clustering is an important and widely used tool in customer segmentation (Mooi and Sarstedt, 2011). A cluster is a collection of data objects that are similar to one another within the same cluster and are dissimilar to the objects in another cluster (Hosseini et al., 2010).

K-Means is one of the well-known and widely used clustering algorithms. K-means is based on assigning each data point to its nearest centroid.

3.5 Association rules

The association rule algorithm was used to determine frequent item sets occurring synchronously in marker baskets (Chen, 2015). For instance, in shopping market, if a customer who buys item X buys item Y as well, there exists a relationship between two products.

Apriori is one of the best algorithms, which is performed to discover hidden relationships between attributes in transactional databases (Liao et al., 2010).

In terms of extracting knowledge from the database, we used IBM SPSS Modeler software. It allows users to conduct statistical and DM algorithms without programming and makes complex predictive models very easy to use.

4 Results and discussion

A total of 854 valid questionnaires were received. The respondents were selected from Facebook and Instagram, because these social media networks have a great variety of participants.

Table 5 shows the frequency of customers’ data. It contains gender, age, education level, and marital status.

4.1 Customer segmentation

After understanding descriptive properties of the statistical population, IBM SPSS Modeler 18 software was used to perform clustering analysis. To cluster the customers, we used data extracted from the first, second and third parts of our questionnaire. The second and third part attributes are scored from 1 to 5 points (Likert scale). Due to the
limitation of specific customer segmentation in a match up clothing and CRM dimensions, the experts’ comment and previous studies (Shokouhyar et al., 2019, 2020, 2021; Shokoohyar et al., 2020; Rahman et al., 2014; Lin et al., 2010) were used to find suitable cluster numbers (Table 6). Furthermore, Silhouette was utilised to evaluate the separation of the clouds of points by measurement of many samples. Thus, the higher the Silhouette, the more compact and separate the clusters (Dalton et al., 2009).

Table 5  Customer’s data

<table>
<thead>
<tr>
<th>Items</th>
<th>Variables</th>
<th>Count</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>30 or younger</td>
<td>408</td>
<td>30.91%</td>
</tr>
<tr>
<td></td>
<td>30–40</td>
<td>364</td>
<td>9.48%</td>
</tr>
<tr>
<td></td>
<td>40 or more</td>
<td>82</td>
<td>9.60%</td>
</tr>
<tr>
<td>Gender</td>
<td>Female</td>
<td>439</td>
<td>64.28%</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>415</td>
<td>35.71%</td>
</tr>
<tr>
<td>Educational degree</td>
<td>Less than high school/diploma</td>
<td>61</td>
<td>7.14%</td>
</tr>
<tr>
<td></td>
<td>Bachelor</td>
<td>244</td>
<td>29.15%</td>
</tr>
<tr>
<td></td>
<td>Master</td>
<td>427</td>
<td>50%</td>
</tr>
<tr>
<td></td>
<td>PhD or higher</td>
<td>122</td>
<td>14.28%</td>
</tr>
</tbody>
</table>

Table 6  The result of clustering

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cluster 1 (388)</th>
<th>Cluster 2 (269)</th>
<th>Cluster 3 (197)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market information</td>
<td>3.26</td>
<td>3.06</td>
<td>2.84</td>
</tr>
<tr>
<td>Product demand</td>
<td>3.32</td>
<td>3.12</td>
<td>2.63</td>
</tr>
<tr>
<td>NPD</td>
<td>4.31</td>
<td>3.91</td>
<td>3.42</td>
</tr>
<tr>
<td>Customisation</td>
<td>4.17</td>
<td>3.62</td>
<td>3.31</td>
</tr>
<tr>
<td>Trust</td>
<td>3.67</td>
<td>4.25</td>
<td>4.41</td>
</tr>
<tr>
<td>Brand loyalty</td>
<td>4.03</td>
<td>4.41</td>
<td>4.32</td>
</tr>
<tr>
<td>Jointly responsible</td>
<td>2.61</td>
<td>2.82</td>
<td>2.21</td>
</tr>
</tbody>
</table>

Table 6  The result of clustering (continued)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cluster 1 (388)</th>
<th>Cluster 2 (269)</th>
<th>Cluster 3 (197)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The speed of responding</td>
<td>2.83</td>
<td>3.02</td>
<td>2.34</td>
</tr>
<tr>
<td>Real-time warehouse</td>
<td>2.86</td>
<td>2.67</td>
<td>2.65</td>
</tr>
<tr>
<td>Customer-based site</td>
<td>3.02</td>
<td>3.06</td>
<td>2.85</td>
</tr>
<tr>
<td>Matchup clothing</td>
<td>4.24</td>
<td>3.65</td>
<td>3.02</td>
</tr>
<tr>
<td>Age</td>
<td>30 or younger (the most frequency)</td>
<td>30–40 (the most frequency)</td>
<td>30–40 (the most frequency)</td>
</tr>
<tr>
<td>Gender</td>
<td>Female: 261</td>
<td>Female:109</td>
<td>Female: 68</td>
</tr>
<tr>
<td></td>
<td>Male: 127</td>
<td>Male: 160</td>
<td>Male: 129</td>
</tr>
<tr>
<td>Educational degree</td>
<td>Bachelor: the most frequency</td>
<td>Master: the most frequency</td>
<td>Master: the most frequency</td>
</tr>
<tr>
<td>Marriage</td>
<td>Single: the most frequency</td>
<td>Married: the most frequency</td>
<td>Married: the most frequency</td>
</tr>
</tbody>
</table>
This, Silhouette index, which ranges from –1 to 1, was equal to 0.8 in the present study.

The summery of CRM dimensions is like this (Table 7):

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Cluster 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Information sharing</td>
<td>3.29</td>
<td>3.09</td>
<td>2.735</td>
</tr>
<tr>
<td>Customer involvement</td>
<td>4.24</td>
<td>3.76</td>
<td>3.365</td>
</tr>
<tr>
<td>Long-term partnership</td>
<td>3.85</td>
<td>4.33</td>
<td>4.36</td>
</tr>
<tr>
<td>Joint problem solving</td>
<td>2.72</td>
<td>2.92</td>
<td>2.275</td>
</tr>
<tr>
<td>Technology-based CRM</td>
<td>2.94</td>
<td>2.865</td>
<td>2.75</td>
</tr>
</tbody>
</table>

Table 7 shows the results of applying clustering analysis. Thus, three clusters were confirmed with this measurement:

- The first group includes people interested in outfit matching who care about this issue more than others do. In other words, most of the female customers with the age of 30 or younger, who have a bachelor degree and are single, are inspired to outfit matching. Furthermore, according to the extracted scores of the second part of our questionnaire, NPD and customisation from customer involvement dimension gained the highest scores in this cluster.

- The second group contains customers who follow outfit matching but not too much. On the other side, most of the male customers with a mean age of 48, with a master degree, and married status are not interested in matching up clothing. Also, brand loyalty and trust from long-term partnership dimension were significant factors in cluster 2 and 3, but brand loyalty is more significant than cluster 3.

- The third group includes consumers who do not engage in outfit matching. The importance of trust is higher than cluster 2.

However, the number of consumers who like to match their clothing is considerable. Thus, it creates a good opportunity for designing new package of clothing.

Figure 1 Matrix of scattering the clusters
In order to discuss more, we used two scatter plots: the match-up clothing vs. customer involvement and match-up clothing vs. long-term partnership. The location of clusters in Figure 1 and Figure 2 describe customer group preferences. As it shown, customisation and involved in NPD (customer involvement dimension) are significant factors for customers interested in outfit matching. The result in cluster 1 is rather reasonable since younger customers prefer to follow their various orientations and try to wear clothing in a way that shows their characters. So, outfit matching is a remarkable factor for them. Furthermore, as it was mentioned, females were the leader of cluster 1 and their tendency to involve in fashion trends and outfit matching is not something inconsiderable. The position of cluster 1 corroborates this idea.

On the other hand, customers who are not interested in matching up clothing prefer to buy products from specific reliable brands and have no time for following the latest fashion. Moreover, building a strong partnership is more considerable for older customers who do not like to engage themselves with a variety of fashion. In addition, we cannot ignore gender as a significant factor. Males were the representations of cluster 2 and they care fashion engagement less than females. So, the combination of Figure 2 and previous behaviour researches, brand loyalty and trust are more important for them.

4.2 Association rules

In this section, our goal is to discover behavioural purchasing pattern existing among those three clusters. First, we select the behavioural purchasing patterns that give us some significant information about customers. To do so, many websites like Amazon and many others data analytics were investigated. Thus, some significant customer habits for clothing purchasing were extracted. First, we extracted the significant buying behaviour patterns in cluster 1 (Table 8). Then, in order to complete our study, the relationships between descriptive attributes and customer buying behaviour patterns were explored (Table 9).

Table 8 describes important rules through cluster one. Based on the obtained results, 71.429% of customers, who match their outfits, take inspiration with friends’ ideas and care about the employee behaviour. Due to the frequency of female in the cluster one, a strong positive correlation between this cluster and their friend’s ideas is reasonable. Also, employee behaviour is one of the effective factors for building a long-term
partnership between customer and companies (Waal and Heijdan, 2016). These results show people and social factors are really important for cluster one’s customer.

**Table 8**  Association rules between cluster 1 and their behavioural pattern

<table>
<thead>
<tr>
<th>Consequent</th>
<th>Antecedent</th>
<th>Support %</th>
<th>Confidence %</th>
<th>Lift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cluster 1</td>
<td>Taking inspiration: friend’s idea</td>
<td>50.0</td>
<td>71.429</td>
<td>1.67</td>
</tr>
<tr>
<td></td>
<td>Employee behaviour: important</td>
<td>28.571</td>
<td>75.0</td>
<td>1.312</td>
</tr>
<tr>
<td>Cluster 1</td>
<td>Kinds of buying: with previous program</td>
<td>21.429</td>
<td>66.667</td>
<td>1.167</td>
</tr>
<tr>
<td>Cluster 1</td>
<td>Taking inspiration: friend’s idea</td>
<td>14.286</td>
<td>50.5</td>
<td>1.216</td>
</tr>
<tr>
<td></td>
<td>Season: winter</td>
<td>21.429</td>
<td>53.1</td>
<td>1.52</td>
</tr>
</tbody>
</table>

Notes: Minsup = 10%, Minconf = 55%.

Furthermore, purchase with previous plans has strong relationship with customer tendency to outfit matching. It was predictable because they knew exactly what they wanted to purchase.

From Table 9, some interesting relationships were found that describe strong rules of customer buying habits.

Females spend the most on clothing and accessories in winter. The reasonable explanation is that the variety of winter clothing for a female is more than other seasons in Iran. Therefore, they spend the most on clothing in this season. Also, Iranian female prefers to buy clothing from physical stores with their friends. As we can see from Table 8, the majority of women being attracted by style in store and friends recommendation during shopping confirm this theory (Baird and Parasnis, 2011). Regarding educational degree, customers with bachelor educational level take inspiration with style in stores. Accordingly, young buyers that have a lower degree are attracted by style in stores. This research is further confirmed by the lift value, where having a lift value between 1 and 2 implies a positive correlation. So, the lift value 1.8 suggests a strong positive correlation between singles and take inspiration with friends’ ideas.

**Table 9**  Association rules between descriptive attributes and their behavioural pattern

<table>
<thead>
<tr>
<th>Consequent</th>
<th>Antecedent</th>
<th>Support</th>
<th>Confidence</th>
<th>Lift</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender: female</td>
<td>Season: winter</td>
<td>57.143</td>
<td>87.5</td>
<td>1.364</td>
</tr>
<tr>
<td>Gender: female</td>
<td>Taking inspiration: friend’s idea</td>
<td>35.714</td>
<td>80.33</td>
<td>1.244</td>
</tr>
<tr>
<td></td>
<td>Purchasing in sale: from 51% to 70%</td>
<td>14.286</td>
<td>75.5</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>Taking inspiration: style in store</td>
<td>14.286</td>
<td>50</td>
<td>1.61</td>
</tr>
</tbody>
</table>

Note: Minsup = 10%, Minconf = 55%.

In order to discussed findings in relation to existing literature or past research:

- Previous studies discussed that creating a facility for customers to customising products with their own needs is very important in the fashion industry (Tong et al., 2018; Rahman and Kharb, 2018). Also, this research explored that customisation and involved in NPD are significant factors for customers interested in outfit matching.
We found that trust and brand loyalty are significant factors in the fashion industry. Also, empirical studies in fashion industry demonstrate that loyal customers are likely to repurchase the products of a brand and recommend the brand to others (Hui and Yee, 2015; Su and Tong, 2016).

Many researches recommended that DM techniques can be useful to engage customer in the process of NPD in fashion industry. Also, we used clustering and association rules for exploring customer behaviour.

Based on literature review, technology-based CRM has positive effects on all five types of innovation in computer industry (Lin et al., 2010). But this dimension is not significant for customers in fashion industry. It shows that the importance of CRM dimensions depends on the case study.

Regarding to literature review, customer buying behaviour influence customer tendency to outfit matching. Also, the result of this research found that customers who like outfit matching, attracted by style in store and friends recommendation during shopping, prefer winter clothes and buy with previous program.

5 Research implications

One of the biggest challenges for both marketing researchers and practitioners is to understand complex consumer behaviours. Our findings show like previous studies (Liao et al., 2010; Rahman et al., 2014) that fashion brand managers should recognise the key roles that CRM dimensions and customer behaviour play in NPD. Hence, fashion brands should continuously invest their efforts to analyse and improve CRM dimensions based on customer behaviour.

Strategies for promoting CRM dimensions based on customer behaviour begun with awareness companies. Recognising that base, as implied by our findings, we recommend:

- Five external dimensions were defined CRM (Lin et al., 2010). As previous studies found (Hui and Yee, 2015; Su and Tong, 2016) customer involvement and long-term partnership programs are significant in fashion industry.

- According to previous studies, customers want to know about market information, product demand, information inventory, and production plans for making a better decision (Watson and Yan, 2013). But the results of this article shows this dimension does not have property for customer in fashion industry.

- Joint problem solving dimension is more significant for industries that produce expensive and high-tech products (Lee et al., 2015; Kumar et al., 2016). Also, we found that this dimension is not remarkable for customers.

- Real-time warehouse and customer-based site are selected for customer-based CRM dimension (Kim and Martinez, 2012; Zhang et al., 2010). The results show that the importance of this dimension in not too much for customers in fashion industry.

So, in this study, two dimensions (customer involvement and long term partnership) represent a specific set of opportunities and challenges for marketers. So, the following paragraphs discuss implications:
5.1 Customer involvement dimension

Along came the industrial revolution, and goods became the predominant economic offering, we used commodities as a raw material to be able to make or manufacture goods. So, we moved from an agrarian economy to an industrial economy. Well what then happened over the last 50 or 60 years, is that goods have become commoditised; where people do not care who makes them. The just care about one thing: price. Now, there is an antidote to commoditisation, and that is customisation. So, we moved from an industrial economy to a customer-based economy. Nowadays, understanding how your customers feel about your company is critical if you want to avoid losing them. Asking for feedback is the first step, but knowing how to receive and assess that feedback is vital. As we mentioned in this study, investigating a remarkable behaviour like customer tendency to outfit matching can be a key to success. Many websites and several apps create for this reason. Its available on the computer and in the Android app store. Also, Social media pages can influence the way in which we handle feedback as individuals, and how we can learn to receive it effectively and use it to enhance our performance. Social media can provide a suitable environment for engaging customer during product development. Sharing events, asking customers for feedback, hold a competition for finding creative idea can be useful.

5.2 Long-term partnership dimension

Customers who are not interested in outfit matching prefer to buy clothing from specific trustful brands and have no time for following the latest fashion.

Even a customer who likes a brand, has received good service, and intends to stay loyal, can be distracted and by a competitor. The key to stopping your customers from succumbing to that distraction, is building strong relationships with them. In order for your customer feedback process to really deliver results, we need to embrace transparency. Gather as much feedback as you can, and ensure you have a process for sharing information with them. Thus, electronic magazine or sending daily news can be suitable.

6 Managerial implications

As stated in the introduction section, evidently based on the previous studies, most of the managers in fashion industry do not have a good perspective from customer segmenting. The reason behind this issue as stated in the introduction is using statistical analysis in fashion articles. Thus, applying DM techniques give the managers the insight what customer needs or wants (Rahman et al., 2014).

Previous studies chose different measures for customer clustering like customer preferences (Cardoso et al., 2010; Rahman et al., 2014) or CRM (Chiang, 2013; Ranjan and Bhatnagar, 2011). Due to the high level of competition in fashion (Hui and Yee, 2015), considering both customer preferences and CRM, can be a good way for clustering customer and extracting customer habits based on their attribute.

The results of the study give the managers the opportunity to know customers and develop new product base on this knowledge.
Based on the theoretical implications that have already been represented in the research implications section, this study suggests the managers of fashion companies in Iran to concern about external customer involvement and building long term partnership. Firstly, it gives the managers the idea that customer prefers to engage in all steps of NPD and be a partner for their favourite brands. So, managers understand what customer really wants. moreover, due to the high level of competition in fashion industry, managers should think about creative ways such as outfit matching. the results of the study give the managers the insight about the differences between customers and planning based on buying behaviour for each group of customers. Thus, the effective managers are supposed to provide and consider opportunity for using current result in their fashion companies.

7 Conclusions, Limitation and future research

The findings of this study assist marketers in identifying customer preferences and developing effective strategies to promote CRM systems in the fashion industry. CRM is considered as an obligatory strategy to develop a firm’s competitive advantage and enhance firm’s innovation capacities. Customers’ preferences and wants are the core of CRM systems. Thus, we need an effective system that can respond firms’ customer needs. CRM capability is a multidimensional concept; this research examines five types of internal CRM system in the fashion industry.

According to the results of this research, female customers with the age 30 or younger, who have a bachelor degree and are single, are inspired to outfit matching and prefer customer involvement dimensions. Also, long term partnership is the most significant dimensions of CRM for consumers who do not engage in outfit matching.

Regarding to investigate customer tendency to outfit matching, some customer habits were studied. Winter clothing package for single young female can be a worthwhile option. Furthermore, these customers take inspiration from their friend’s recommendation and style in stores. Thus, we should consider all of these findings for developing a new package and CRM.

Our study illustrates CRM dimensions based on consumer tendency to outfit matching. Moreover, our finding imply that difference customer groups can have disparate desires and priorities. This framework can help marketers to study customer satisfaction, while taking into account a wide number of significant influencing factors such as customer preferences, customer buying behaviour, CRM dimensions and consumer desire to outfit matching.

Accordingly, this research shows how marketing managers in fashion industry can use DM techniques such as clustering and association rules in their marketing practices. It is evident that fashion companies have a huge number of customers with different preferences and behaviour. So, it is difficult to study customer tendencies without DM techniques. These techniques enable marketers to categorise similar customers in different clusters and study clusters separately. Understanding this knowledge can help managers to align their development priorities with actual customer’s needs.

This article has limitations as most investigations have. We could not cover all of the customers’ statistical attributes and all classifications of CRM system. Due to the limitation of data security, some important variables like income, occupation, and living area are missed. Accordingly, considering more comprehensive factors may have led to achieving results that have more generalisability. In addition, this research investigated
some shopping malls customers. So, the majority of the participants belonged to the young age group in Iran. Consequently, one should be cautious to generalise these results to higher age groups. Future researchers might also focus their efforts on considering other fashion customers.

Although the external CRM dimensions used in this study have been widely validated and adopted by previous studies, they could not consider all items like internal CRM factors in this investigation. So, other works can practice on internal dimensions (e.g., organisation structure, culture, and KM) of CRM system.

Finally, the main goal of this research is to discover significant dimensions of CRM in fashion based on customer tendency to outfit matching. So, we focus on match up clothing as a remarkable customer behaviour. Future studies can focus on other factors.

References


Promoting fashion CRM dimensions based on customer tendency


