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CREATING AN ENVIRONMENT CONDUCIVE FOR DEVELOPING CUSTOMER COMMITMENT: DOES SHOCK INTENSITY MAKE A DIFFERENCE?

Abstract:
Customer relationship management has become more important than ever before, especially since service providers are faced with increased competition. It is not surprising to find that both marketing academics and practitioners are progressively confronted by the challenge to create new and innovative ways to manage relationships with customers. Although relationship management entails managing a vast number of dimensions, customer commitment is often viewed as one of the most important elements of any marketing relationship. Given this importance, service providers need to provide services in line with the promises made to customers. Service providers also need to strive towards creating an environment in which customers feel comfortable and free from unexpected changes. The reality is that no service is fail-safe, resulting in a situation where customers are frequently confronted with negative experiences. These negative experiences are often referred to as relational shocks.

It was against this background that this study investigated the influence that varying levels of relational shocks might have on customer commitment. Three experiments were conducted. In each of the experiments, respondents were exposed to a different shock scenario, namely a low, a medium or a high shock scenario. A total of 372 Generation Y respondents participated, and the mobile phone industry was selected as context for the study. Data were analysed by means of SPSS Statistics version 25, and a one-way ANOVA was performed to examine possible differences.

The results of the study revealed that the three different levels of relational shocks indeed influenced customer commitment, but not all three types of commitment (affective, calculative and normative) were influenced equally. The study also highlighted the importance of limiting relational shocks in general to improve customer commitment. However, the major contribution of the study is that it is the first of its kind, as far as could be ascertained, to investigate the effect of different levels of relational shock on customer commitment, specifically from a mobile phone perspective.

Keywords:
Affective commitment
Calculative commitment
Normative commitment
Relational shocks

JEL Classification: M31
1. Introduction

Due to the exponential growth in the availability of products and services, it is more important than ever before to build commitment with customers (Terrones, Prasad & Kose, 2008). This increased relevance of commitment is to be expected, especially, because of the vast benefits that business might receive from applying relationship-marketing practices (Wilson, Zeithaml, Bitner & Gremler, 2012). For commitment to be fostered, an environment needs to be created that is conducive to developing cooperation between individuals, which is a requirement for effective marketing relationships (Grawe, Daugherty & Ralston, 2015). Unfortunately, not all environments are conducive from the perspective of relationship formation. A typical example of this is when a relational shock occurs that will have a harmful effect on customer commitment (Morrell, Loan-Clarke & Wilkinson, 2004). By eliminating these relational shocks, service providers are in a better position to build customer commitment.

In order to create an environment that is conducive to developing commitment, this study investigates the possible effect of different shock scenarios on customer commitment. This paper commences with an overview of the literature in which the nature and scope of both commitment and relational shocks are addressed. It is followed by a discussion of the methodology employed as well as the empirical results of the study. The paper concludes with a discussion of the major managerial implications of the study.

2. Commitment

Commitment has been studied from various perspectives such as psychology (Hur, Park & Kim, 2010, economics (Marti & Sindelar, 2015), human resource management (Karim & Noor, 2017) and organisational behaviour (Meyer, Stanley, Herscovitch & Topolnytsky, 2002). From a relationship marketing perspective, which is of particular importance to this study, commitment was found to be a central variable of any marketing relationship (Zhang, Watson, Palmatier & Dant, 2016). It is expected to find that commitment is key to developing and maintaining marketing relationships (Parsa & Cobanoglu, 2011). Once commitment is established and properly managed, a service provider could experience an increase in market share, and ultimately increased profits (Jones, Fox, Taylor & Fabrigar, 2010).

A review of the existing literature reveals different definitions of the concept of commitment. For example, Verma, Sharma and Sheth (2016) refer to commitment as the enduring desire to maintain a valued relationship. This description is similar to an earlier definition by Morgan and Hunt (1994) that commitment is the willingness to maintain a relationship because of exchange partners who believe the ongoing relationship is important. In addition, Bansal, Irving and Taylor (2004) define commitment as a binding force that compels an individual to continue purchasing products from a specific firm. Despite this apparent lack of congruence in defining the
concept of commitment, it is evident that commitment is established based on concepts such as value, beliefs, maintaining a relationship and continuance.

2.1 The dimensionality of commitment

The debate on whether commitment is a unidimensional or a multidimensional construct continues, but there appears to be growing support for the multidimensional view of commitment (Keiningham, Frennea, Aksoy, Buoye & Mittal, 2015; Jain, Khalil, Johnston & Cheng, 2014). In order to encompass the different views on the dimensionality of commitment, this study relies on the multidimensional character of commitment, meaning that commitment consists of three distinct components: an affective, a calculative and a normative component. According to Lariviere, Keiningham, Cooil, Aksoy and Malthouse (2014), affective commitment, in essence, pertains to ‘wanting’ to maintain the relationship, calculative commitment pertains to ‘having’ to maintain the relationship, and normative commitment pertains to feel as though you ‘should’ maintain the relationship.

Affective commitment refers to the component of commitment that has received the most attention in the commitment literature (Bergman, 2006). It is described as associated with feelings of identification, belongingness, involvement, and affection to a firm (Meyer et al., 2002). The concept is also described as a desire to remain committed to a firm because of the psychological and emotional bond a customer has towards the firm (N’Goala, 2007). Consequently, when the perception of the self matches the perceptions of the firm, a customer will feel a sense of belonging to the firm, thereby creating an emotional bond (affective commitment) with that firm (Gilliland & Bello, 2002).

The second component of commitment refers to calculative commitment, which is often described as a customer’s need to be committed to the firm (Bansal et al., 2004). Calculative commitment is also explained as a customer feeling as though they are ‘locked down’ to the firm because of some economic reason (Gilliland & Bello, 2002). Possible reasons for the development of calculative commitment are that there might not be enough attractive alternatives available for a customer to switch, and the benefits a customer gains from a firm will be lost if they switch to a competitor (Bergman, 2006). Calculative commitment may develop in situations where a customer has invested so much time, money and effort into a relationship with a firm that ending it will disrupt the customer’s life (Skarmeas, Katsikeas & Schlegelmilch, 2002).

The third component of commitment (the latest to be identified and described) is normative commitment. It is not surprising to find that normative commitment has received less attention in the literature than the previous two components of commitment (Vandenberghhe, Mignonac & Manville, 2015). Normative commitment refers to an obligation, sometimes also referred to as a moral obligation, to remain committed to a firm (Gilliland & Bello, 2002). According to Wang (2014), normative
commitment relates negatively to emotional exhaustion in employees, whereas the concept can also predict an individual’s involvement in the production of an organisation’s products or services (Fairley, Green & Chalip, 2014). A further result of normative commitment is that customers will participate in activities beyond what is required (Caron & Fortin, 2014).

According to Shukla, Banerjee and Singh (2016), the three-component model of commitment offers a suitable platform for examining the emotional (affective), the functional (calculative) and the social (normative) aspects of commitment.

3. Relational shocks

The concept of relational shocks originated within the organisational behaviour literature with limited application to consumer behaviour. Thus, existing examples of relational shocks in the literature mainly relate to the organisational literature (Mitchell & Lee, 2001). Lee and Mitchell (1994) define relational shocks as an initial jarring event that causes an individual to consider exiting their relationship with a firm; also, as a distinguishable experience that causes a shock to a human being. According to Lee and Mitchell (1994), this shock will cause the receiver to decide about the implication of the shock. Eventually, relational shocks play an important role in an individual’s decision to terminate their relationship with a firm (Lee, Mitchell, Wise & Fireman, 1996). In order to be classified as a shock, Mitchell and Lee (2001) identify four characteristics that a situation must comply with: the situation must be unexpected; it could be of either a positive or negative nature; it must stem from a customer’s personal life; and the situation must be outside the control of the individual.

From a relationship marketing perspective Palmatier, Scheer, Evans and Arnold (2008) argue a customer might respond negatively to relationship marketing efforts when the customer realises the cost of the relationship outweighs the benefits. In addition, customer commitment decreases when dissatisfaction with a relationship is experienced (Cao & Gruca, 2005). Yeung and Ramasamy (2012) endorse the fact that examples of the type of shocks in the marketing literature may include product recalls, immoral actions of a firm as well as negative publicity about a firm. Further forms of relational shocks from a marketing perspective include service failures (Hess, Ganesan & Klein, 2003), critical incidents (Gustaffsson, Johnson & Roos, 2006), conflict or injustice (Zhang et al., 2016) and products crises (Van Heerde, Helsen & Dekimpe, 2007). Based on the criteria identified by Mitchell and Lee (2001), all the examples above can be classified as relational shocks; though, from a marketing perspective.

The literature fails to provide clear guidance on the impact of relational shocks. When a customer is exposed to a relational shock such as a service failure or negative publicity, there can be a number of impacts to a firm (Hess et al., 2003). These impacts include a decrease in sales and brand equity (Yeung & Ramasamy, 2012) and a change in attitude strength (Ahluwalia, Burnkrant & Unnava, 2000).
4. Relational shocks and commitment

The general lack of knowledge in the literature on the relationship between relational shocks and customer commitment was mentioned earlier. This situation is in contrast to relational shocks from an organisational perspective where the relationship between these two concepts is described reasonably well (Lee & Mitchell, 1994). It can be argued that a relationship between relational shocks and customer commitment do exist, based on the views of Ahluwalia et al. (2000), Bansal et al. (2004) and Jones et al. (2010). However, the scope and nature of this relationship have not been confirmed. The effect of relational shocks and the three components of commitment have even been less researched.

It is evident from the literature that for commitment to flourish, an environment should be created that is conducive to the establishment of commitment. One of the characteristics of such an environment is that the customer should not experience unexpected relational shocks (Morrell et al., 2004).

5. Problem statement, objectives and hypotheses

Although limited, there appears to be some evidence for the possible effect of different levels of relational shocks on commitment (Morrell et al., 2004). However, most of these studies originate from the organisational behaviour context with almost no application to a customer context. It is against this background that this study investigates the possible effect that different levels of relational shocks have on customer commitment.

The primary objective of this study was to determine the change in customer commitment once influenced by the varying levels of relational shocks. This objective was supported by three secondary objectives, focusing on how the three levels of relational shocks influenced each of affective, calculative and normative commitment.

Based on the literature review, the following hypotheses were stated:

\( H_0^1 \): There is no change in affective commitment once influenced by the varying levels of relational shocks.

\( H_{a1} \): There is a change in affective commitment once influenced by the varying levels of relational shocks.

\( H_0^2 \): There is no change in calculative commitment once influenced by the varying levels of relational shocks.

\( H_{a2} \): There is a change in calculative commitment once influenced by the varying levels of relational shocks.

\( H_0^3 \): There is no change in normative commitment once influenced by the varying levels of relational shocks.

\( H_{a3} \): There is a change in normative commitment once influenced by the varying levels of relational shocks.
6. **Research methodology**

A pre-test was conducted to identify the three shock scenarios (low, medium and high shocks). During the pre-test, respondents had to rate 15 possible scenarios regarding the degree to which they experienced the scenario to be a shock. Once the results of the pre-test became available, the main study commenced, which is described in the subsequent section.

*Research method:* A quantitative research method was used. Three experiments were conducted with each experiment focusing on a different shock scenario. The three levels of relational shocks formed the independent variables, and customer commitment was the dependent variable.

*Measurement instrument:* A questionnaire was used during the experiments. The first part of the questionnaire consisted of demographic questions whereas the second part consisted of commitment-specific questions. A seven-point Likert scale was used to assess the respondents’ perception on commitment. All items were sourced from the literature to ensure that only scales of which the reliabilities had been previously confirmed were used. Some of the items had to be adapted to reflect the context of the study. This adaptation was performed in such a manner that the original meaning of the items was not altered.

*Sampling:* The target population for this study consisted of all South Africans who owned a mobile phone device. Since no sampling frame existed for this study, a non-probability sampling technique was employed. For convenience, undergraduate students from a leading South African university were selected as potential respondents.

*Data analysis:* The reliability of the measurement instrument was assessed using Cronbach’s alpha. One-way ANOVA was calculated to analyse the possible differences between the three levels of shocks and commitment. Levene's test will be used to assess the equality of variances for the groups. The statistical program SPSS (version 25) was used to conduct this inferential analysis.

7. **Empirical results**

### 7.1 Results of the pre-test

Once the respondents had assessed each of the initial 15 shock scenarios, mean scores were calculated for each of the scenarios. The next step was to identify the three scenarios with the lowest, middle and highest mean scores. The three scenarios were labelled the low, medium and high shock scenarios. The three shock scenarios appear in Table 1.

**Table 1: The resultant shock scenarios**
The results of the study are presented according to the realised sample, the reliability of the measurement instrument and inferential statistics.

### 7.2.1 Realised sample

The main study consisted of a three-group experiment using an overall sample of 372 respondents. One-hundred and thirty respondents were gathered in the low shock group, 145 respondents were gathered in the medium shock group, and 97 respondents were gathered in the high shock group.

### 7.2.2 Reliability of the measurement instrument

A Cronbach alpha analysis was conducted on the three main variables of this study (the three types of commitment) to assess the reliability of the measurement instrument. The results of the analysis appear in Table 2.

#### Table 2: Reliability scores

<table>
<thead>
<tr>
<th>Commitment</th>
<th>Low shock</th>
<th>Medium shock</th>
<th>High shock</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affective</td>
<td>0.822</td>
<td>0.652</td>
<td>0.643</td>
</tr>
<tr>
<td>Calculative</td>
<td>0.606</td>
<td>0.524</td>
<td>0.695</td>
</tr>
<tr>
<td>Normative</td>
<td>0.859</td>
<td>0.798</td>
<td>0.807</td>
</tr>
</tbody>
</table>
All the measures in Table 2 (except for one) provide evidence of internal consistency. This finding is based on the view of Zikmund et al. (2013) that Cronbach alphas of 0.6 and higher are acceptable to prove the internal consistency of a measurement instrument. The generally assumed cut-off point of 0.7 would have been preferred, but it should be kept in mind this study is exploratory. If the exploratory nature of the research is considered, the relative low reliability level of 0.524 for calculative commitment in the medium shock group is almost to be expected. This low reliability score is, unfortunately, a limitation of the study.

7.2.3 Inferential statistics

One-way ANOVA was used to investigate the hypotheses along with a 95% confidence interval. The independent variables of this study were the three relational shock levels, and the dependent variable was commitment. Table 3 summarises the results of the changes in commitment once exposed to varying levels of relational shocks.

<table>
<thead>
<tr>
<th>Scores</th>
<th>Affective commitment</th>
<th>Calculative commitment</th>
<th>Normative commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levene statistic</td>
<td>0.493</td>
<td>0.353</td>
<td>0.373</td>
</tr>
<tr>
<td>Mean score for low shock</td>
<td>3.530</td>
<td>3.770</td>
<td>3.019</td>
</tr>
<tr>
<td>Mean score for medium shock</td>
<td>3.380</td>
<td>3.850</td>
<td>2.667</td>
</tr>
<tr>
<td>Mean score for high shock</td>
<td>3.160</td>
<td>3.612</td>
<td>2.489</td>
</tr>
<tr>
<td>$F$-value</td>
<td>0.311</td>
<td>1.464</td>
<td>7.267</td>
</tr>
<tr>
<td>$P$-value</td>
<td>0.046</td>
<td>0.233</td>
<td>0.001</td>
</tr>
<tr>
<td>Tukey</td>
<td>Low and high shocks ($p=0.035$)</td>
<td>Not applicable</td>
<td>Low and medium ($p=0.007$)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low and high ($p=0.002$)</td>
</tr>
<tr>
<td>Bonferroni</td>
<td>Low and high shocks ($p=0.039$)</td>
<td>Not applicable</td>
<td>Low and medium ($p=0.008$)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low and high ($p=0.002$)</td>
</tr>
</tbody>
</table>

Regarding affective commitment, the Levene statistic is above 0.05; therefore, the assumption of equal variances across the three relational shock groups was equal. In addition, the mean scores for each shock level were different. These differences were significant because the $p$-value generated was below 0.05. Thus, $H_0^1$ can be rejected. This rejection of $H_0^1$ meant that there was a significant difference in affective commitment when relational shock levels changed.
A post-hoc test was performed to identify the source of the differences (which relational shock scenario caused the changes in affective commitment). The two post-hoc tests used were Tukey and Bonferroni. As indicated in Table 3, the results of both these post-hoc tests indicated that affective commitment differed between low and high relational shocks. These results were indicated by p-values of 0.035 (Tukey) and 0.039 (Bonferroni) that were below 0.05. The post-hoc tests further indicated that affective commitment did not change between low and medium shocks or between high and medium shocks.

The Levene statistic for calculative commitment was also above 0.05, meaning that the variances between the three shock groups were equal. There were slight differences in the mean scores for the low, medium and high relational shocks. These differences were not significant since the p-value was above 0.05 at 0.233. Therefore, H02 cannot be rejected. In other words, calculative commitment did not change in conjunction with the varying relational shock levels.

Regarding normative commitment, the Levene statistic was once again above 0.05, indicating that the variance across the three relational shock groups was equal. Also, there were differences between the mean scores for all three relational shock levels. These differences were significant because the p-value (0.001) was below 0.05. Therefore, H03 was rejected. In other words, normative commitment did change once the level of relational shock changed.

Tukey and Bonferroni’s post-hoc tests were conducted to investigate which relational shock levels contributed to the changes in normative commitment. Both post-hoc tests indicated that normative commitment changed between the low and medium relational shock levels. The p-values of both tests for normative commitment were below 0.05 for differences between the low and medium shock level. The results of the two tests indicated that normative commitment changed between low and high relational shocks. The p-value of 0.002 (which was below 0.05) indicated this difference.

The empirical results are summarised in Table 4.

<table>
<thead>
<tr>
<th>Type of commitment</th>
<th>Supported differences</th>
<th>Shock levels causing differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affective</td>
<td>Yes</td>
<td>Between low and high</td>
</tr>
<tr>
<td>Normative</td>
<td>Yes</td>
<td>Between low and high</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Between low and medium</td>
</tr>
<tr>
<td>Calculative</td>
<td>No</td>
<td>-</td>
</tr>
</tbody>
</table>

The results in Table 4 are discussed in the next section.
8. Discussion

The results of this study revealed that affective commitment changed according to varying shock levels, but it was only applicable to the low and high shock scenarios. This finding implied that respondents’ affective commitment towards their mobile phone service providers did not change when exposed to a relational shock between a low and a medium level or between a medium and a high level. However, their level of affective commitment did change when the difference between relational shock levels was perceived as more severe (as was the case with the difference between low and high shock scenarios).

These findings appear to agree with the view of Maertz and Campion (2004) who found that a customer’s level of affective commitment is dependent on the level of relational shock. Similarly, Mitchell and Lee (2001) contend relational shocks conjure up episodic memory because of a shock’s importance to the customer. Episodic memory is associated with emotional feelings and influences affective commitment.

The study also found that normative commitment was influenced by the difference between low and high shock scenarios and between the low and medium shock scenarios. However, the study failed to confirm any significant differences between the medium and high relational shock scenarios. These findings were to be expected and confirmed the work by Gilliland and Bello (2002), and Maertz and Campion (2004). It was concluded that a customer’s sense of obligation to a service provider depended on the level of the relational shock.

The findings regarding normative commitment should be viewed with caution. Customers are starting to show fewer levels of obligation to a firm because they are becoming smarter in their ways of purchasing (Kotler & Keller, 2016). More specifically, it is the younger generation who is revealing these patterns of little obligation to a firm because of the abundance of alternatives available to them (Parsa & Cobanoglu, 2011). For example, if a firm does not fulfil these younger customers’ levels of expectations, these younger customers will simply switch to another firm (Tedlow & Jones, 2014). A customer can feel obliged to remain loyal to a firm for many reasons, but one of them being out of a sense of morality (Woodside, 2004). The research by N’Goala (2007) seems to strengthen this viewpoint with the statement that when a customer is exposed to a relational shock, their moral obligation to that firm tends to fade, influencing normative commitment.

Despite the support found in the literature for possible differences between the levels of relational shocks and calculative commitment, this study fails to confirm any of these differences. This finding is somewhat unexpected and needs clarification. It is important to note that within the South African mobile phone industry, contractual agreements are a dominant characteristic of the service (Simons, 2017). It is possible that respondents feel that normative commitment is almost redundant since they are already contractually...
bound to their mobile service providers. It should also be kept in mind that the number of mobile phone service providers is rather limited, which means respondents have limited choices. Once a shock appears, the respondents have to deal with it since there are limited options regarding alternative service providers available.

9. Recommendations

It should be noted that the South African economy could generally be described as volatile, which is often associated with relational shocks. Therefore, it is possible that South Africans experience shocks as somewhat ‘normal’ business behaviour and might declare the lack of difference detected among some of the shock scenarios.

Considering that affective commitment does change with varying relational shock levels, some implications pertain to managers in the South African mobile phone industry. It is important that managers proactively put measures in place to avoid relational shocks such as inconvenience and unethical behaviour of staff members. A method that can be used by managers to avoid such scenarios could be proper training of staff members. For example, an extensive training programme before a staff member is permanently employed could be a viable option. Moreover, this training programme should equip staff members with the appropriate competencies to perform their jobs on a level of excellence, proactively avoiding relational shock scenarios such as the ones used in this study. The training method should include teaching staff members to identify a relational shock from the customer’s point of view. Customers and employees might view a relational shock differently. Staff members who understand relational shocks from a customer’s perspective, could identify the severity of the relational shock scenario and act proactively.

Since this study found that normative commitment does change with the change with the varying levels of relational shocks, it is important that all the proactive measures mentioned for affective commitment be put in place for normative commitment. These measures include the training programme, hiring of suitable staff members and implementing a service quality programme. The proactive measures can be put in place to avoid relational shock incidents of, once again, inconvenience (low relational shock) and unethical behaviour (high relational shock), as well as poor staff communication skills (medium relational shock).

With these measures in place, managers will be making an effort to prevent normative commitment from changing and preventing the ultimate relationship between the customer and firm from being damaged. Similarly, as with the case of affective commitment, it is not always possible to foresee and prevent relational shock scenarios from taking place. For this reason, it is necessary to have measures in place that will restore normative commitment once relational shocks have influenced it.
The first implication for managers in the South African mobile phone industry, if relational shocks influence their customers’ normative commitment, is that it is important to have a service recovery programme in place that targets the customer’s personal values. Once again, customer data can be helpful to target specific customers.

Managers also need to ensure the customer knows to what extent their mobile phone service provider went to recover from the relational shock. The customer may then feel a sense of responsibility to remain with the firm despite having experienced a service failure. The customer might feel the need to reciprocate their mobile phone service provider’s great efforts to restore the customer’s normative commitment, and they might feel guilty to leave.

10. Limitations and future research

The findings of the study are promising, but a number of limitations inhibit the general applicability of the results. Firstly, the relatively small sample size (372 split into three groups) results in a situation that the empirical findings might be somewhat inaccurate. Secondly, some authors might frown on the use of convenience sampling and the use of student samples. Thirdly, the relatively low reliability score for calculative commitment could also be viewed as a limitation of the study. It should be kept in mind that this study was of an exploratory nature. It was never intended to be a comprehensive confirmation of the literature.

The literature could gain significantly by a repetition of the current study, but with the limitations of the above being considered. By focusing on different industries, a more refined sampling plan and the application of more advanced statistical techniques, valuable insights into this important topic could be gathered.

11. Conclusion and contribution of the study

In order to contribute to the current body of knowledge, this study aimed to investigate whether shock intensity makes a difference when managing commitment. Some results of the study coincided with the existing literature, but it was interesting to learn that some of the expected findings did not realise. For example, the study failed to establish any differences in calculative commitment based on varying levels of relational shocks.

This study contributed in various ways to the current understanding of the effect of relational shocks on commitment. By investigating the effect of relational shocks on customer commitment (as opposed to organisational commitment), a valuable contribution was made. In addition, it was the first study of its kind, as far as could be ascertained, to investigate the problem from the perspective of the South African mobile phone service context. It should always be kept in mind that the South African experience could be vastly different to those of more developed countries.
Despite the fact that the results of this study appear to be promising, it is of utmost importance that this study is replicated in different environments. Only once this has been done, can a broader body of knowledge start to emerge, which will ensure that service providers develop a heightened sensitivity to the possible occurrence of relational shocks and that they are better equipped to handle and manage these shocks.

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References


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