

## **EVALUATION OF CUSTOMER RELATIONSHIP MANAGEMENT (CRM) SYSTEMS FOR SMALL SERVICE BUSINESSES**

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### **ABSTRACT**

Although several Customer Relationship Management (CRM) evaluation frameworks have been developed in the past years, they are usually complex, oriented toward large organizations and from the firm's perspective only. This study proposes a CRM evaluation model which is simple for a small business to use and takes into account three different perspectives: the business, the staff and the customer. The need for this model arose when one of the co-authors had to evaluate and select a CRM system suitable for a small business. Also, although the evaluation will be done within the context of a specific business, this model and the multiple perspective approach can be used with minimum modifications as an evaluation and reference tool for other CRM decision-makers in small service businesses. <https://doi.org/10.13033/ijahp.v9i1.473>

Keywords: customer relationship management; CRM evaluation; AHP; CRM perspectives

### **1. Introduction**

There are many small businesses that rely heavily on a Customer Relationship Management (CRM) system to perform successfully. While working for a small business, one of the authors questioned whether or not this specific organization should keep their current CRM system or invest in a new one and if so, which one. While there are many definitions for a CRM system, for the purpose of this study a CRM system is defined as a technological tool that allows “a strategic approach that is concerned with creating improved shareholder value through the development of appropriate relationships with key customers and customer segments” (Lee et al., 2014; Friedrich, et al., 2012; Baran and Galk, 2017). Because small businesses do not have information specialists, an intuitive and simple evaluation approach was needed. For this reason, it became clear that

using the Analytic Hierarchy Process (AHP) approach would be the most efficient way to help the organization make this decision. The reason for this is that AHP is very intuitive for practitioners and has been used in multiple selection tasks such as the selection of the best extraction technology for medicinal plants and the selection of a suitable business model for mobile commerce (Jain & Bakul, 2013; Ali, 2015).

While doing research looking for a suitable CRM evaluation model, we found that there were many articles previously published using AHP to evaluate CRM systems including open source CRM systems. However, we realized that most, if not all, of these articles were focused only on complex CRM systems for large organizations. For this reason, this study proposes an original selection model that allows small businesses to benefit from its use.

The objective of this study was to identify the key factors to take into consideration when performing a CRM evaluation for a small business. We decided that while doing the analysis, we would come up with a model that can be useful as a quick evaluation and reference tool for other small service business CRM decision-makers.

## **2. Literature review**

We first performed a systematic search on the web of a science database. Keywords such as “CRM systems”, “CRM small business”, “CRM family business”, “CRM family-owned company” and “CRM selection and CRM evaluation” were used and produced 451 results. We reviewed those results and initially came up with a total of 14 studies relevant to this study as shown in Table 1.<sup>1</sup> The relevant studies were divided into four different categories and are discussed below.

### *Dated literature*

Colombo and Francalanci (2004) proposed selecting CRM packages based on architectural, functional and cost requirements using an AHP model for that purpose. Similarly, Min (1992) proposed an AHP model to select CRM packages. However, we decided that literature that was more than ten years old was too dated for our study since CRM has evolved very fast during the last ten years. Therefore, these articles were reviewed, but not directly used in our study.

### *Non-peer-reviewed literature*

We also decided that our model should be based on academic findings rather than unverified claims in the discipline. For this purpose, we decided to read practitioner’s material for general knowledge purposes, but did not use it directly in the construction of our model. Jones (2013), Goldenberg (2008) and Kostojohn (2011) fell into this category of practitioner-oriented reference books; these were read but not directly used in our model due to their lack of peer-review academic validation. Similarly, Ghavani and

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<sup>1</sup> The number of relevant studies increased to 17 once we added, based on a reviewer’s suggestion, studies published from Jan 2016-April 2017 as shown in Table 1.

Alireza (2006) was not used for our model, given that this was a Master's thesis. One particular mention corresponds to Friedrich and Breitner (2016) which corresponded to a chapter in a book written mainly in German and describes a process model not suitable for a small firm. Similarly, Baran and Galka (2017) describe CRM marketing functions that although useful for practitioners do not directly help small businesses make CRM selection decisions.

*Non-selection models*

There was also literature that discussed CRM systems from the point of view of process models; that is models that describe CRM implementation as a process consisting of several stages in which CRM selection is only the first stage in the process. Chang et al. (2015), Pollard et al. (2006) and Friedrich et al. (2012) fell into this category. Therefore, their usefulness was only marginal. One exception is Rigby et al. (2003) which provided a good introduction of why choosing the right CRM had strategic importance for winning customer loyalty. This was used for the motivation part and to provide context to our CRM evaluation.

Table 1  
List of relevant references for the study

ITEM#	REFERENCE	MAIN FINDINGS
1	Min, H. (1992)	It describes how to decide the appropriate CRM software for your organization. This article was too dated for our use as it was written in 1992.
2	Rigby, et al. (2003)	This article describes how to decide what CRM software should be used. Good reference about the importance of CRM systems.
3	Colombo and Francalanci (2004)	This article describes the development of an AHP model to select a CRM system among multiple CRM packages. This article is too old for our purposes; it is more than 10 years old and CRMs have evolved ever since.
4	Ghavami and Olyaei (2006).	Discusses CRM impact on customer retention. This result was not incorporated for our research purposes as it was not peer-reviewed.
5	Pollard, et al. (2006)	It proposes a process model in which CRM implementation moves from stage to stage. Not suitable for selection but for implementation.
6	Jones, P. (2013)	A guide to selecting the best CRM solution and it is useful as a reference but it is not peer-reviewed and therefore, not used in our study.
7	Goldenberg (2008)	This is another good article identifying CRMs and keeping customer relationships. However, it is a practitioner piece, not peer-reviewed.
8	Jadhav and Sonar (2009)	Describes how to decide what CRM software should be used using AHP process. Good reference for methodology.
9	Friedrich, et al. (2011)	This article provides a thorough description of how experts would use AHP to choose the best CRM system for large companies. While too complex for our purposes, we were able to use the major parts to develop our model.
10	Kostojohn (2011)	Generic discussion of CRM systems. Not peer-reviewed and therefore, not used in our study.
11	Friedrich, et al. (2012)	This article was extremely complex and process oriented and very specialized for large companies in the automotive industry.
12	Lee, et al. (2014)	This article uses AHP to select an open access CRM package. It also provides information for organizations to choose a CRM system for its functionality aspect as well as from the perspective of the organization. This article was also key for the current study.
13	Chang, et al. (2015)	This article proposes a model to aid in the selection of CRM products and the evaluation of CRM vendors. However, the focus is more on the implementation than on the selection.
14	Friedrich and Breitrner. (2016)	This is a chapter in a book which is mostly in German. Also, a process model is not suitable for a small business firm.
15	Keramati and Shapari (2016).	Describes the criteria for choosing a CRM system, however the use of three combined methodologies is too complex and not suitable for a small business.
16	Pedron, et al. (2016).	This article does describe possible criteria businesses may take into consideration when choosing a CRM system, however the main focus was on how to implement the CRM system.
17	Baran and Galka (2017).	This book provides a detailed description of a CRM system as it's need in any business, how to use it for marketing, as well as the challenges it can cause. This provided the study with a foundation of the qualities of CRM systems and their functions.

*Selection models*

Finally, the articles that were more directly relevant to the development of our model were Jadhav et al. (2009), who performed an exhaustive review of the CRM evaluation literature including AHP techniques, and Friedrich et al. (2011) and Lee et al. (2014), who provided very comprehensive and large scale models but which were structured enough to allow for fragmentation and simplification for our proposed model for small businesses. Friedrich et al. (2011), in particular, provided a thorough description of how experts would use AHP to choose the best CRM system for large companies. We were able to review different types of criteria and sub-criteria used for CRM selection. They propose three key criteria: quality, cost and functionality. Quality involves several sub-criteria such as data integration, modifiability/maintainability, performance, popularity, portability, reliability, resources, security, timeliness, training/support and usability. Cost is composed of six dimensions or sub-criteria: maintenance, preparation/installation, resources, systems costs, training/support and upgrade. Functionality consists of account management, call center, campaign management, contact management, customer service, field service, Internet, lead/opportunity management, relationship management, reporting and sales management.

The second key article was Lee et al. (2014). This article provided information for organizations to choose a CRM system for its functionality aspect as well as from the organization’s perspective. We were able to reference the complex hierarchy shown in Figure 1 to help further our research.

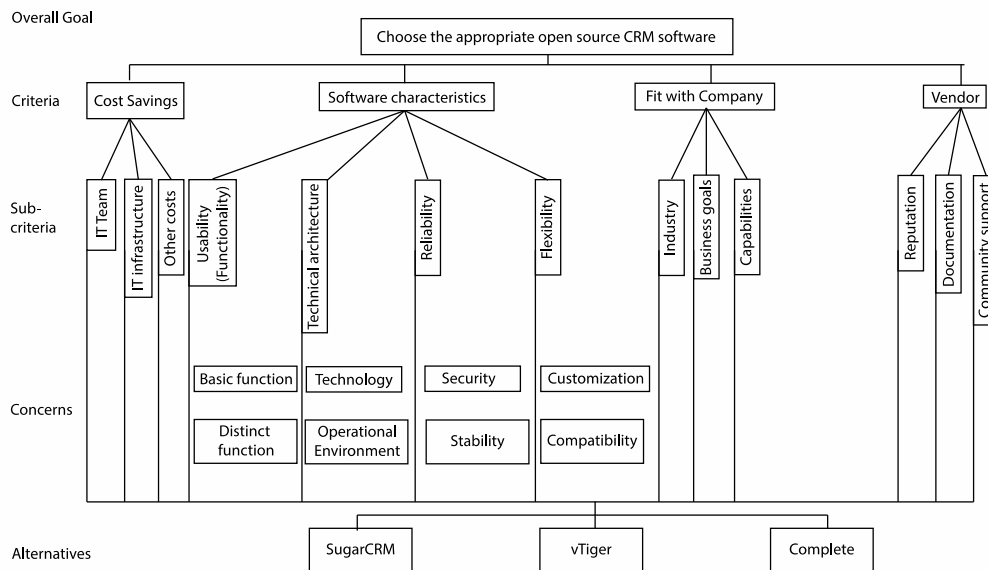


Figure 1. The hierarchical structure for open source CRM software selection  
Source: Lee et al. (2014)

### **3. Methodology**

First, decision factors for CRM evaluation were identified based on information from extant literature (Table1), and then requirements from organizational experts were gathered. After we reviewed the literature and gathered the requirements from the client organization, we came to the conclusion that AHP stakeholder analysis needed to be done from three different perspectives: the business, the user (staff), and the client. From each of these perspectives, we identified the most important criteria, developed ratings decision models for each, and finally integrated the different perspectives by multiplying the priorities of the alternatives. This last step is common practice in the integration of multiple perspectives in which each decision model is different but the alternatives are common (Saaty & Mu, 1997; Mu & Pereyra-Rojas, 2016).

### **4. Developing the decision models**

An AHP ratings model analysis was done for each of the perspectives prior to their integrations as will be shown next.

#### **4.1 Business perspective**

The first decision hierarchy was created from the business perspective as this is a very important factor when evaluating a new CRM system for a small business. For this purpose, a business professor with entrepreneurship, practical, and academic experience assisted with the business model definitions and the weighting of elements.

##### **4.1.1 Business perspective definitions**

Friedrich et al. (2011) helped identify the three most important criteria that define the business perspective. These three criteria were Quality, Functionality, and Cost. The business perspective model elements are shown in Table 2.

Table 2  
Business perspective criteria  
Source: Friedrich et al. (2011)

<b>Criteria</b>	<b>Key Elements</b>
Quality	Usability- How ‘user friendly’ is the application? Business people need to be able to extract reports with ease while ensuring their staff and customers can use it with a minimum number of mistakes. Data Integration- Ease of sharing data between technical and business processes. Even small businesses have multiple systems (e.g. accounting) that the CRM will need to share and integrate data with.
Functionality	Contact Management- Tracking all information and communication activities linked to contacts. Includes ability to keep track and contact customers through multiple media channels such as LinkedIn, Facebook, etc. Relationship Management- Continuous level of engagement between customers and clients that allows initiatives such as birthday gifts and loyalty initiatives
Cost	Maintenance Costs – Refers to the costs to keep the system running. Includes preventive maintenance, repairs and associated costs to keep the system running. System Costs – This is the actual cost of the application itself and may consist of monthly payments for the base system and additional costs for upgrades. Preparation and Installation Costs – The business may need to incur in infrastructure upgrades (e.g. new computers) to satisfy the application technical requirements.

*Quality criterion*

The Quality criterion involves a strict and consistent commitment to certain standards that achieve uniformity of a product in order to satisfy specific customer or user requirements. It consists of two sub-criteria: Usability and Data integration.

Friedrich et al. (2011) defines usability as a way to improve customer satisfaction by ease of use. According to the expert’s opinion, if the system is too difficult to manage, then it raises the chance of mistakes occurring, thus causing customer satisfaction to decrease. Data integration is the ease of sharing data between technical and business processes. This is further defined by the expert as being able to collect data (usually client information) and being able to view and use this data for daily business procedures.

*Functionality criterion*

The Functionality criterion is the range of operations the application can perform to help with the overall business performance and consists of two sub-criteria: Contact and Relationship management. Contact management is the ability of the application to track information and communication activities between the small business and clients. Relationship management allows the application to uphold a continuous level of engagement between businesses and clients.

*Cost criterion*

The Cost criterion is the cost to the small business to purchase, install and maintain the application throughout its use. Three sub-criteria have been identified as important for our study: Maintenance, System and Preparation/installation costs.

Maintenance cost is the cost for the small business to preserve the full functionality of the application. Systems cost is the cost of the application itself. According to the expert's opinion, many CRM systems allow businesses to pay monthly, or pay one large sum for the system and then pay extra for any upgrades that might become available later on. Preparation and installation costs include the cost to the small business to implement the actual application. The expert states that some small businesses will also have to purchase software such as computers, etc. to be able to host the new application in addition to the system itself. There also might be the purchase of payment transaction equipment to consider as well.

**4.1.2 CRM evaluation model from business perspective**

The hierarchical decision model for the business perspective is shown in Figure 2. The decision model has three levels since each criterion has its own sub-criteria.

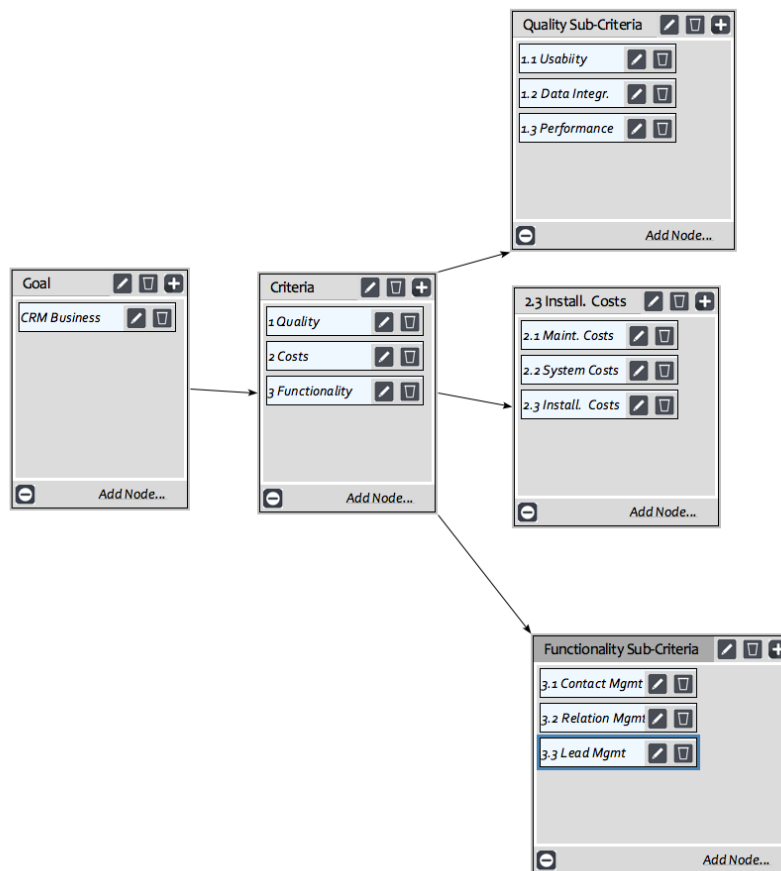


Figure 2. Business perspective decision model



**4.2 User (staff) perspective**

Unlike a corporation, a small business does not have the funds to hire a specialized CRM staff to manage a complex CRM system; therefore, we decided that the user or staff perspective should also be considered when choosing a CRM system. For this purpose, a staff member currently using a CRM system participated in development of the business model using this perspective and the weighting of its elements. This staff member handles daily issues with the current CRM system, including a lack of system organization, which makes it difficult to use particularly in accessing customer information. This overall lack of performance creates scheduling difficulties that waste time resulting in staff member frustrations and a potential loss in revenue. For these reasons, the participation of this staffer participation was key to address this model perspective.

**4.2.1 User (staff) perspective definitions**

Again, based on the extant literature and a staff expert opinion we identified the three most important criteria for the User (staff) perspective hierarchy (Friedrich et al. 2011). These three criteria are: Usability, Performance, and Accessibility. Their definitions (key elements) are shown in Table 3.

Table 3  
User (staff) perspective criteria with key elements and weight  
Source: Friedrich et al. (2011) and staff CRM expert opinion (2016)

<b>Criteria</b>	<b>Key Elements</b>
Usability (Friedrich et al., 2011; Lee, 2014)	How ‘user friendly’ is the application? Staff must be able to use the system with ease and minimum of errors.
Performance (Friedrich et al., 2011)	Scheduling- ability to easily schedule appointments Time Saving- reducing the amount of time needed to complete a task
Accessibility (Staff expert opinion, 2016)	The quality of requested content being available when needed and using multiple platforms (e.g. iPad)

*Usability criterion*

As previously defined, the Usability criterion is the ease with which one can learn and successfully use the application. As it is too costly for a small business to hire specialized CRM staff, their own staff must be able to utilize the system from day to day.

*Performance criterion*

Performance criterion concerns how well a system can process the functions required of it. According to Friedrich et al. (2011), if the application does not perform its required functions external consulting may be needed causing costs that are higher than budgeted. Two performance functions (sub-criteria) are important: Scheduling and Time saving. Scheduling is how well the application can schedule appointments. This is specifically for small businesses that rely on appointments for their clientele to be successful. According to the expert’s opinion, when a client experiences scheduling problems, it

causes customer satisfaction to decrease, which potentially causes loss of revenue. Time saving is how well the application can reduce the time needed to complete a task. Similar to the scheduling sub-criteria, if too much time is wasted in completing a task, it can also cause clients to become unsatisfied. Also, the more time focused on a single activity limits how many clients can be managed at a time. This is another potential loss in revenue.

#### *Accessibility criterion*

This criterion concerns how well the application can make requested content available when needed. According to expert opinion, it is crucial for client information to be not only easily accessible, but that this information is pertinent to the user's position. This, again, allows for overall customer satisfaction.

#### **4.2.2 Evaluation model from user (staff) perspective**

Figure 3 depicts the hierarchical decision model developed for the user (staff) perspective. Only the Performance criterion has two sub-criteria: Scheduling and Time saving.

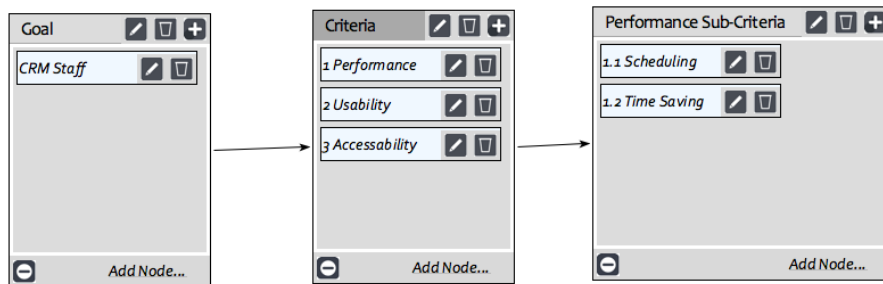


Figure 3. User (staff) perspective decision model

#### **4.3 Customer perspective**

Because a small business's success rate depends heavily on the satisfaction of their customers, the effect of a CRM system on these customers is very important. For this perspective, we realized that we did not really need a customer from the specific target business but rather a customer that used the same services provided by the client. Based on this we selected as representative of the customer stakeholders, a person who was a heavy user of these services to assist in refining the model definitions and weighting.

##### **4.3.1 Consumer perspective definitions**

Once more, a ratings model was used to identify two criteria for the Customer perspective. These criteria, Customer scheduling and Customer engagement, are described in Table 4.

Table 4  
 Customer perspective with key elements and weight  
 Source: Friedrich et al. (2011) and Customer Representative Opinion (2016)

<b>Criteria</b>	<b>Key Elements</b>
Customer scheduling	Online Scheduling- allowing clients to schedule their appointments online
Customer engagement	Messaging- ability to efficiently and effectively inform clients of vital information

*Customer scheduling criterion*

This criterion measures whether or not the application allows clients to schedule their own appointments. According to the customer representative’s opinion, clients are too busy during their daily lives and need the option of scheduling their own appointments when it is convenient for them. The key functionality is called the Online scheduling sub-criterion. This sub-criterion describes whether the system allows clients to schedule their appointments online or not. As mentioned before, clients want the opportunity to plan their appointments themselves with the convenience of online scheduling.

*Customer engagement criterion*

The Customer engagement criterion describes how well the application provides opportunities for the small business to communicate with its clients. This means allowing the business to inform the client of new products, sales, and even new services. In this case, the identified key functionality is the Messaging sub-criterion, which is the ability for the system to efficiently and effectively inform clients of vital information. This information consists of anything that might be of importance to the client like a new product launch or that the business will be unexpectedly closed. There are certain situations where the client needs to be informed immediately of something that affects them and their appointment, and it is crucial to the success of the business that these clients can be informed as promptly as possible.

**4.3.2 Customer perspective evaluation model**

The hierarchical decision model for the customer perspective is shown in Figure 4. Both the Scheduling criterion and the Engagement criterion have multiple sub-criteria, based on the extant literature and discussion with the client representative.

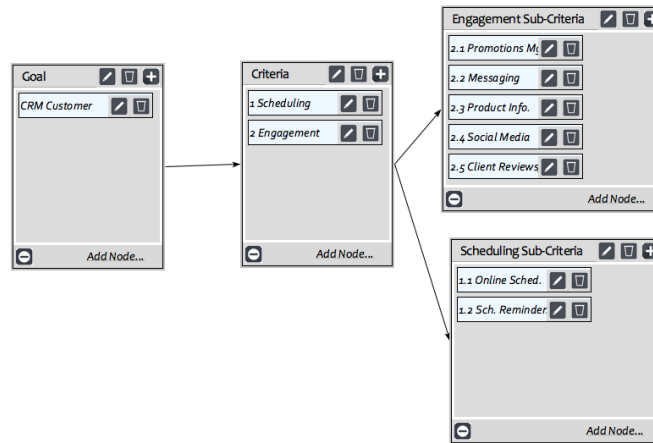


Figure 4. Customer perspective decision model

#### 4. 4 Alternatives

To perform the analysis on these three factors, we evaluated three possible CRM systems: Millennium, Mikal and Salon Iris. The Mikal system was chosen first because it is the current CRM system the expert staff member is using, albeit an older version. Millennium and Salon Iris were chosen next because each of them encompasses areas that Mikal had not yet developed when this study was performed. Millennium’s focus is on new technology for more developed features, while Salon Iris focuses on the latest accessibility trends. Each of these are described in more detail below, however with these three CRM systems, we have created a model that potentially embraces each CRM type.

##### 4.4.1 Millennium

This CRM system was created in 1987 and is used in small businesses in over 36 countries. One advantage is that it can be cloud based or privately hosted. It can also be accessible on any Internet device. Millennium’s website describes how their focus on the latest technology provides it with an advantage for the business, the staff members who will use it, and the customers because it allows the system to be accessible at all times (MilleniumIT, 2017). The ease of access minimizes the difficulty in making any last-minute scheduling changes as well providing the greatest customer service.

##### 4.4.2 Salon Iris

Salon Iris is a CRM system developed in 1999 in Wixom, Michigan (Salon Iris, 2017). Like Millennium, it allows users to access it on any Internet device. However, a significant advantage is that it has its own personalized *App* for android or iPhone allowing easier access for any of its users. With this ability to be accessible on an *App* comes the advantage of being extremely user-friendly. The layout of the Salon Iris app is simple allowing users to take advantage of its features without typical layout frustrations. Staff members can use basic data to access any customer information particularly their appointment schedule. This can raise customer satisfaction as it allows immediate communication with ease.

#### 4.4.3 Mikal

Founded in 1982, Mikal is a CRM system that is slowly developing with innovations using new technology (Mikal, 2017). Its latest feature is a system that will look over the appointment schedule, collect data on any openings, and then reach out to specific clients to let them know of these openings. However, staff experience with the system provided the knowledge that Mikal is behind with their own technology causing their system to be extremely hard to use. It lacks an organized layout and ease of access, which causes many mistakes to occur. Like a domino effect, these mistakes thus cause customers to be unhappy with the small business as their appointments have a higher chance of being scheduled incorrectly.

### 5. Analysis and results

Using the AHP methodology and the newly released Super Decisions software v3 to perform the calculations, each stakeholder representative compared pairwise the criteria of the corresponding perspective (ensuring inconsistency was less than 0.1 in all cases) to obtain the weights corresponding to the criteria/sub-criteria corresponding to each of the perspective hierarchies (Super Decisions, 2017). Next, an AHP ratings model was used for each of the perspectives where a single scale ranging from 1 to 5 (1-Deficient, 2-Below average, 3 – Average, 4 – Above average and 5-Excellent) was used to evaluate the alternatives with respect to each and all criteria. Each scale item had an associated value (0.2, 0.4, 0.6, 0.8 and 1.0 respectively) which was used for the quantitative assessment of the alternatives as will be shown in Tables 5, 6 and 7. Again, the representative of the business perspective performed the evaluation of alternatives from this perspective, the staff representative did the same for the Staff (user) perspective and the customer representative

#### 5.1. Business perspective

The hierarchy and results for the business perspective are shown in Table 5. The CRM system that had the highest preference from the Business perspective was Salon Iris with 0.401, followed by Millennium with 0.385, and trailing far behind was Mikal with 0.215.

These results indicate that Salon Iris is, although slightly, the best choice due to its user-friendly layout, low cost of installation and management, and its ability to provide a steady connection between the business and its clients. More clearly, the results also indicate that Mikal is by far the worst choice as it is a higher cost for a poorly organized system. This can be fully appreciated in Figure 5 where the priorities are shown in relation to the maximum (ideal) priority, in this case Iris. Millenium follows at 95.9% of the ideal alternative and Mikal accrues only 53.5% of the ideal priority. Mikal is the clear loser from a business perspective.




Name	Graphic	Ideals
Iris		1.000000
Mikal		0.535350
Millenium		0.959479

Figure 5. Ideal business priorities for the CRM alternatives

### **Sensitivity analysis for the Business perspective**

Appendix A shows a graphic and dynamic sensitivity analysis performed using Super Decisions v3 capabilities. As can be seen in Figures (A1) and (A2) in this appendix, as the importance of the Quality criterion increases, Millennium starts catching up with Iris. More specifically, if Quality gets more than 65% of the overall importance then Millennium becomes a better CRM choice although not by much. This is due to the fact that Millennium is a better choice with respect to each of the quality sub-criteria (1.1 Usability, 1.2. Data integration and 1.3 Performance) as shown in Table 5. On the other hand, with respect to Cost, Iris is always the best alternative as seen in Figures (A3) and (A4). Finally, if Functionality gets above 24.5% of the overall criterion importance, then Iris becomes the best option as shown in Figures (A5) and (A6).

In summary, our sensitivity analysis confirms that Salon Iris is indeed the best option in most of the scenarios, and when it loses the lead with respect to Millennium, it is not by much. Furthermore, this sensitivity analysis shows that Mikal is the worst alternative in all cases.

### **5.2. Staff (user) perspective**

The hierarchy and results for the Business perspective are shown in Table 6. The highest preference from the Staff (user) perspective was Millennium with 0.41 followed closely by Salon Iris with 0.39.

Table 6 results show that Millennium is the best choice as it provides the staff with a CRM system that is easy to use allowing scheduling to be simple and the ease of access to customer information to be superior. These results also indicate that Mikal is the least optimal choice as it greatly lacks in all areas of the User (staff) criterion.

Table 5.  
Ratings model and results for the Business perspective

Alternatives	Priorities	Totals	2.1 Maint... (0.0376)	2.2 System ... (0.0102)	2.3 Install... (0.0046)	3.1 Contact ... (0.0849)	3.2 Relatio... (0.0849)	3.3 Lead ... (0.0283)	1.1 Usability (0.1533)	1.2 Data Integr. (0.0293)	1.3 Performance (0.0670)
Millenium	0.3846	0.7932	0.8000	0.8000	0.8000	1.0000	0.4000	0.6000	0.8000	1.0000	1.0000
Mikal	0.2146	0.4426	0.4000	0.4000	0.6000	0.4000	0.8000	0.6000	0.4000	0.2000	0.2000
Iris	0.4008	0.8267	0.8000	1.0000	0.8000	1.0000	0.8000	0.6000	0.8000	0.8000	0.8000

Table 6.  
Ratings model and results for the User (Staff) perspective

Alternatives	Priorities	Totals	2 Usability (0.6004)	3 Accessibility (0.0737)	1.1 Scheduling (0.1222)	1.2 Time Saving (0.0407)
Millenium	0.4169	0.8371	0.8000	1.0000	1.0000	0.6000
Mikal	0.1847	0.3708	0.4000	0.4000	0.2000	0.4000
Iris	0.3984	0.8000	0.8000	0.8000	0.8000	0.8000

Table 7.  
Ratings model and results for the Customer perspective

Alternatives	Priorities	Totals	2.1 Promotions... (0.0211)	2.2 Messaging (0.0539)	2.3 Product Info. (0.0041)	2.4 Social Media (0.0042)	2.5 Client Review... (0.0000)	1.1 Online Sched. (0.0833)	1.2 Sch. Reminders (0.3333)
Millenium	0.4004	0.8084	1.0000	0.8000	0.8000	0.8000	0.8000	0.8000	0.8000
Mikal	0.2602	0.5253	1.0000	0.4000	0.4000	0.4000	0.4000	1.0000	0.4000
Iris	0.3394	0.6852	1.0000	0.6000	0.8000	0.6000	0.6000	1.0000	0.6000

While the Business perspective showed that Iris had a slight advantage respect to Millenium, our results from the User (staff) perspective suggest the opposite; that is, Millenium now has a slight advantage, approximately 5%, over Iris as shown in Figure 6. Still, Mikal is no competition for the two leading CRM systems.




Name	Graphic	Ideals
Iris		0.955698
Mikal		0.442962
Millenium		1.000000

Figure 6. Ideal User (staff) priorities for the CRM alternatives

### **Sensitivity analysis for the User (staff) perspective**

Appendix B shows the graphic and dynamic sensitivity analysis for this perspective. Figures B1-B2 show that as the importance of Performance increases, Millenium becomes an even more preferable alternative. Similarly, Figures B5-B6 show that increasing the importance of accessibility means that Millenium also increases its preference. The only situation in which Salon Iris may tie with Millenium is if the Performance criterion gets 100% of all the criterion importance, which constitutes a very unlikely scenario, as shown in Figures B3-B4. In summary, the results of the sensitivity analysis show that Millenium is a robust decision from the user (staff) perspective.

So far, we have found that Salon Iris is a robust decision from a Business perspective while Millenium is a robust decision from a user (staff) perspective although the difference is small (about 5%) in each case. Our next step is to evaluate the alternatives from the customer's perspective.

### **5.3 Customer (client) perspective**

The hierarchy and results for the business perspective are shown in Table 7. The CRM system that had the highest preference from the Client perspective was Millennium with 0.40 followed by Salon Iris with 0.33.

Millennium is the winner over Salon Iris because it allows clients to easily schedule online, but also because it provides a way to constantly engage clients with important communication from the business. Once again, Mikal is shown to be the worst choice for a small business as it lacks in client engagement.

While the two previous perspectives showed no more than 5% difference between Salon Iris (winner in the business perspective) and Millenium (winner in the staff perspective); this time, Millenium is a better choice, from a customer perspective, with a 15% lead over Salon Iris as shown in Figure 7.






Name	Graphic	Ideals
Iris		0.847525
Mikal		0.649801
Millenium		1.000000

Figure 7. Ideal Customer (client) priorities for the CRM alternatives

### **Sensitivity analysis for the Customer (client) perspective**

Appendix C shows the graphic and dynamic sensitivity analysis for this perspective. Figures C1-C2 show no difference in the preferences of the alternative for the case of variation of the importance for the Scheduling criterion. Similarly Figures C3-C4 show no difference in the alternative preferences for the case of changing the priorities of the Engagement criterion. A look at Table 6 suggests that Millenium and Salon Iris differ in terms of the scheduling sub-criteria. Millenium is better for scheduling reminders while Iris is better for online scheduling. If scheduling reminders was given even more weight, Millenium would be an even better option. In summary, the sensitivity results indicate that Millenium is clearly the best CRM alternative from the point of view of the customer. Now that we have completed the evaluation of the CRM systems from the different perspectives we need to proceed to integrate them.

### **5.4 Strategic integration of the perspectives**

Standard practices of perspective integration of alternatives consist in a multiplicative aggregation of the priorities of the alternatives in each perspective (Mu & Pereyra-Rojas, 2017). However, for this study, we decided to consider the situation where not all the perspectives were given the same importance<sup>2</sup>. For this purpose, we aggregated the local priorities of the alternatives (“local” with respect to each perspective) using an AHP model to strategically address the CRM systems in terms of the different weights that could be assigned to each perspective as shown in Figure 5. We call this a strategic integration of the perspectives to follow on the strategic criteria proposed by Saaty and Ozdemir (2005). The proposed model for the integration of the three perspectives is shown in Figure 8. Rather than performing judgment comparison, the local priorities of the alternatives with respect to each perspective (Tables 4, 5 and 6) were entered into the model. This initial analysis assumed that all three perspectives (business, staff and customer) were equally important as shown in the priority results in Figure 9. Also, the results were summarized in Table 8 for the reader’s convenience.

<sup>2</sup> This makes sense since in a small business, the business (owner) perspective usually has a very high importance with respect to the interests of the customers and staff.

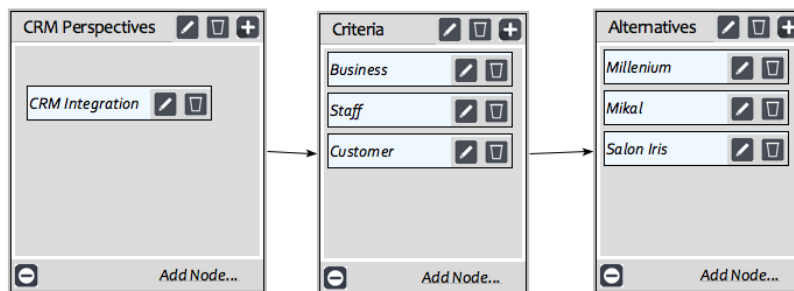


Figure 8. Model for the strategic integration of perspectives

Name	Normalized by Cluster
Mikal	0.22002
Millenium	0.40067
Salon Iris	0.37931
Business	0.33333
Customer	0.33333
Staff	0.33333
CRM Integration	0.00000

Figure 9. Results for the initial scenario of the strategic integration of perspectives

Table 8  
Perspective integration assuming equal importance

	Business (0.333)	User/Staff (0.333)	Customer (0.333)	Priorities
Millennium	0.385	<b>0.417</b>	<b>0.400</b>	<b>0.401</b>
Mikal	0.215	0.185	0.260	<b>0.220</b>
Salon Iris	<b>0.401</b>	0.398	0.339	<b>0.379</b>

### 5.5 Sensitivity analysis of the perspective integration results

The results from Table 8 assume that all the perspectives are equally important. However, an argument can easily be made that these perspectives cannot be equally weighted. In particular, in the case of small service businesses, the business perspective is usually also the owner’s perspective and as such carries a lot of weight. The team members representing the business, staff and customer views got together and compared the perspectives pairwise and reached an agreement on the judgments to be entered. In other words, there was no need to aggregate the judgments using the geometric mean as recommended by Saaty and Peniwati (2007) and the consistency issues were also addressed during the meeting. The results are shown in Table 9.

Table 9  
Perspective integration assuming different importance

	Business (0.635)	User/Staff (0.078)	Customer (0.287)	Priorities
Millennium	0.385	<b>0.417</b>	<b>0.400</b>	<b>0.392</b>
Mikal	0.215	0.185	0.260	<b>0.226</b>
Salon Iris	<b>0.401</b>	0.398	0.339	<b>0.383</b>

The comparison of the results of Tables 8 and 9 show that in the case of perspectives with equal importance, Millenium is a slightly better option (approx. 5%), but when making the business view more important, Millenium’s advantage decreases to approximately 2% and we could consider them tied for practical purposes.

The team discussions suggested that a situation in which both a business and customer perspective were equally important was worth exploring given that financial (business) success is highly correlated with customer satisfaction. Therefore, we decided to explore this situation and obtained the results shown in Table 10.

Table 10  
Perspective integration: same business & customer weights

	Business (0.45)	User/Staff (0.10)	Customer (0.45)	Priorities
Millennium	0.385	<b>0.417</b>	<b>0.400</b>	<b>0.395</b>
Mikal	0.215	0.185	0.260	<b>0.232</b>
Salon Iris	<b>0.401</b>	0.398	0.339	<b>0.373</b>

A more systematic exploration of the sensitivity analysis can be done using the graphic sensitivity capabilities of Super Decisions v3 as shown in Figure 10.

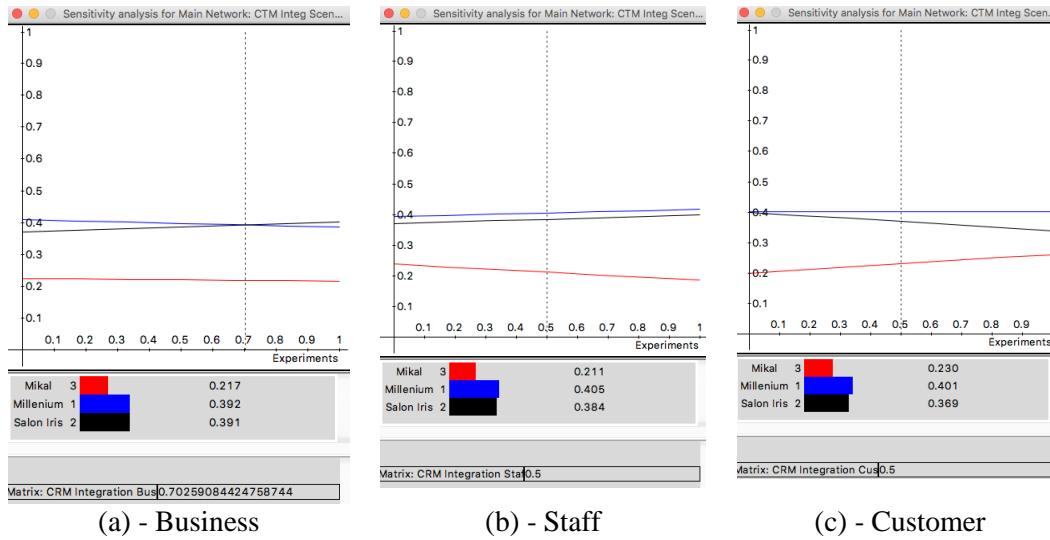


Figure 10. Sensitivity analyses with respect to each of the perspectives

From Figures 10b and 10c, we can conclude that Millenium is a robust decision with respect to the staff and customer perspective, having a strong advantage the more the customer's perspective becomes important. With respect to the business perspective, Figure 10a, Millenium loses its advantage only when the business perspective gets above 70% of the overall importance (while possible, this is an unlikely scenario given that CRM customer satisfaction is also important for business success). In other words, Millenium constitutes the most robust decision taking into account all these sensitivity scenarios.

## 6. Limitations

Given that this evaluation was done with one single evaluator for each perspective, there might be some criticism that one stakeholder expert representative for each perspective is not enough. However, a small business usually has only one expert in each stakeholder category and does not have the ability to perform large scale survey studies, which would be the ideal situation from an academic point of view. Furthermore, the model as such holds for a small service business and it is expected that the weights will actually change from business to business. For example, a struggling business may give a larger weight to the business perspective than to the others. Also, the software evaluation is totally subjective and based on the evaluator's perception of the software based on the documentation and demos; however, this should not lead the reader to conclude that one software package is better than the other. The reader should perform his or her own assessment when using the proposed model.

## 7. Conclusions

This study has provided a basic model that all small businesses can use when deciding which CRM system is most optimal for their business. While previous studies have provided information to choose a CRM system, they have proven to be too difficult for

small business owners who lack CRM system knowledge. Not only is this study tailored to the specific needs of small businesses, it was completed in a way that provides clear and basic understanding for any reader without an extensive AHP or CRM system education.

Unfortunately, with any decision, there comes the threat of bias. When the current CRM staff member provided their small business owner with the study results stating that Millennium was a better choice over Mikal, the owner may be subjected to cognitive biases and decide against making a change.

As shown above, a CRM is important to the success of any small business because it makes engaging customers and managing marketing opportunities possible which in turn benefit the business. Therefore, selecting a suitable CRM is extremely important. This study can now provide a simple, easier way to make a detailed and justified decision about which CRM system is best based on the views of the business, the user, and the clients. As a potential avenue for future research we think that surveying a greater number of stakeholders for each perspective could make streamlining the importance given to the different CRM function criteria possible.

In summary, we have learned the key factors in adopting a CRM system; second, we have developed a CRM evaluation framework for small service businesses that can serve as a reference and best practice reference for decision-maker practitioners interested in considering multiple CRM perspectives. Finally, to our knowledge, this is the first time an AHP study has been conducted using the new Super Decisions v3 and for that reason we felt compelled to provide some notes, based on our experience in this study, in Appendix D.

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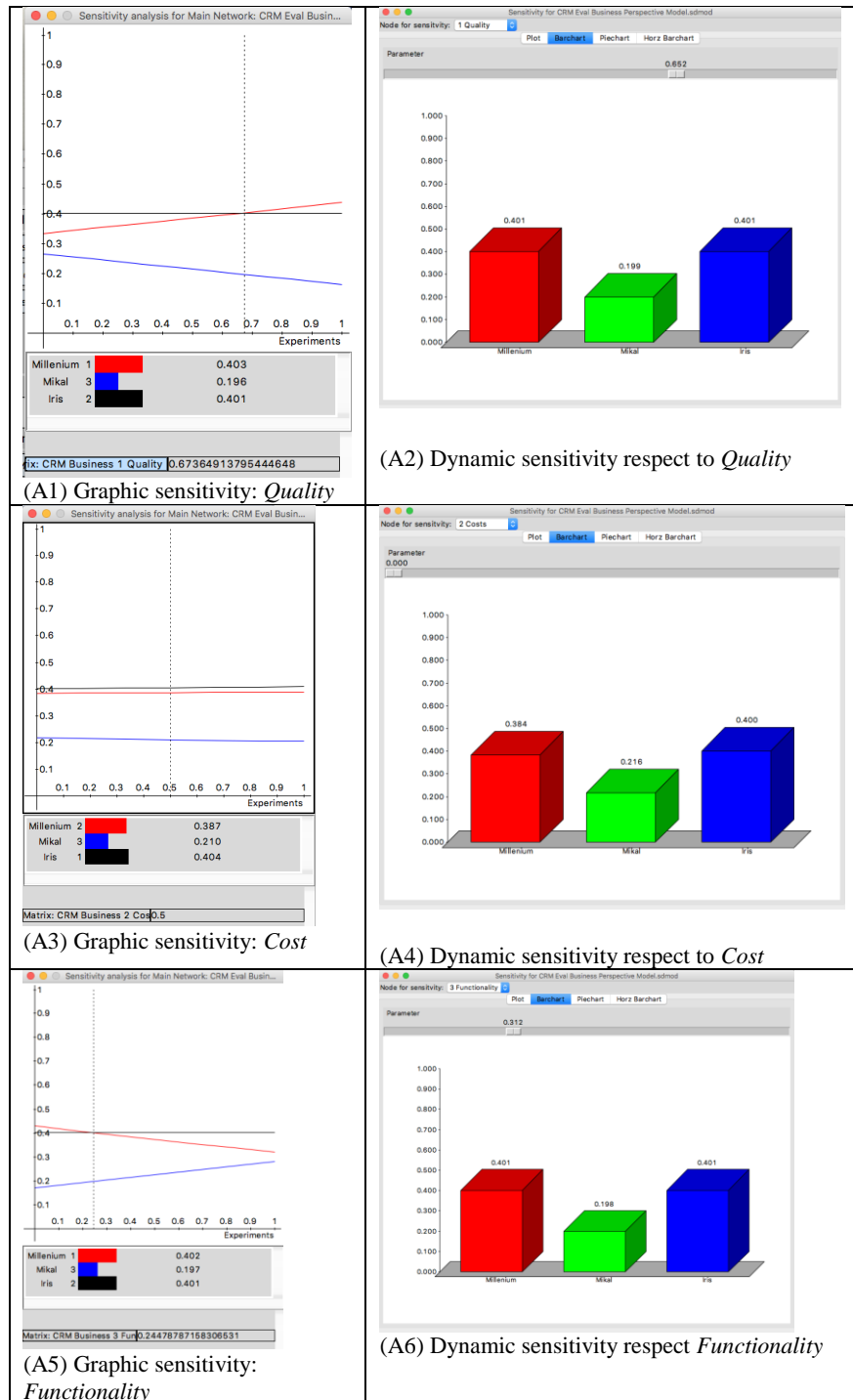
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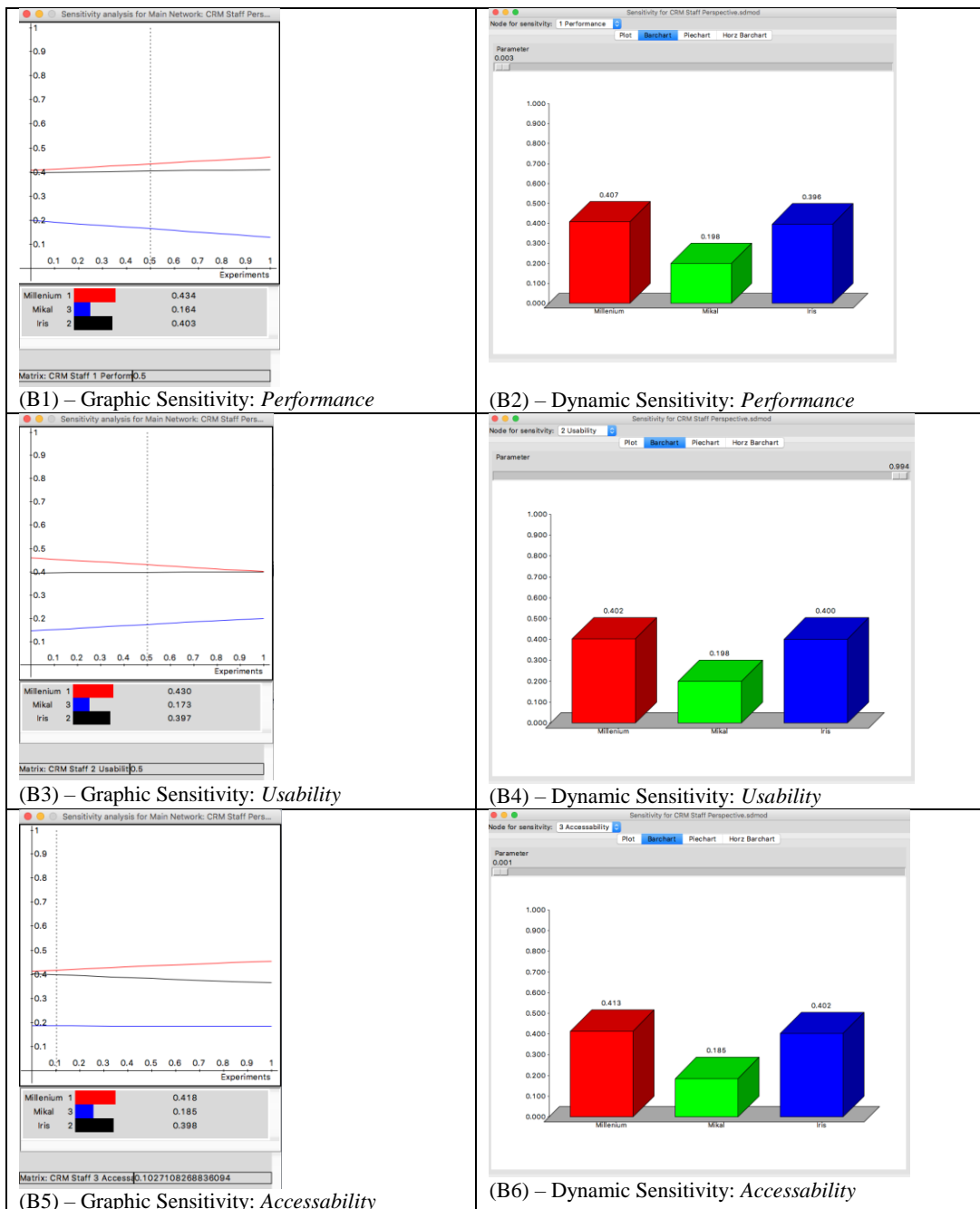
## APPENDICES

### Appendix A. CRM Sensitivity Analysis: Business Perspective

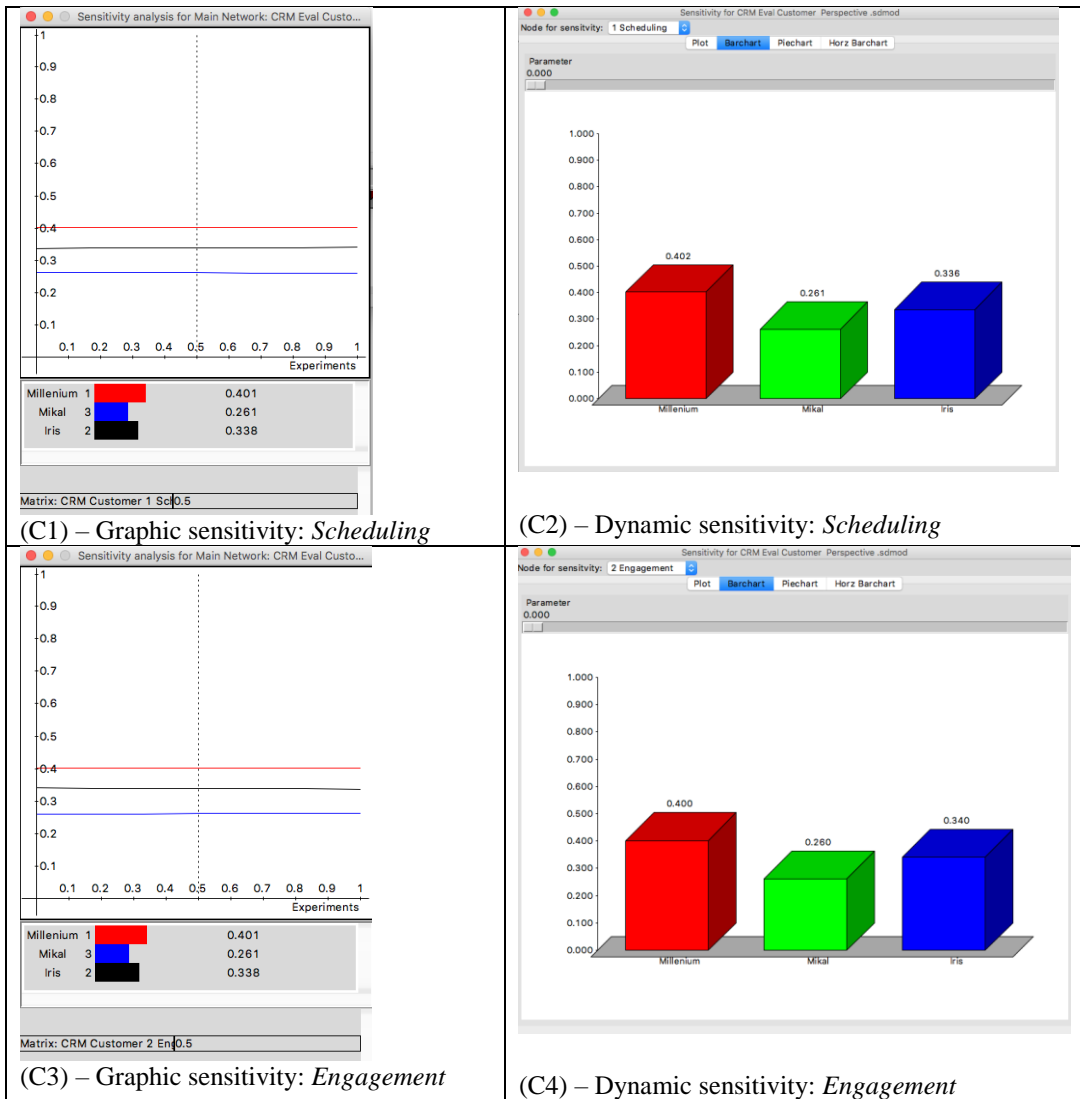




**Appendix B. CRM Sensitivity Analysis: User (Staff) Perspective**



**Appendix C. CRM Sensitivity Analysis: Customer (Client) Perspective**



## Appendix D. Notes on the use of Super Decisions v3.

These notes do not pretend to be a comprehensive review of Super Decisions v3 but to provide the readers with a quick idea of what to expect when using it.

First of all, when designing a model for the first time what is striking is how easy it is to use. Our only instruction was the video tutorial available in Super Decisions (2017). However, SD v3 is easy to use because most of the options are visible (the interface does not rely on drop down menus but rather on a “what you see is what you can do” approach). For aestheticians, you will miss the artistic possibilities of drawing models in the previous version (“color is missed” said one of the authors). Also, the ability to endlessly size and re-size clusters and nodes is missing, and you have to use a scroll down bar to see all the nodes within a cluster.

The top bar menu which has the options “Network”, “Judgments” and “Ratings” follow the logical progression of developing a ratings model. This is the greatest advantage of this software version. Those who have developed ratings models using the current Super Decisions v 2.8 will certainly welcome the simplicity found in v 3.0. Indeed, this was the main reason to adopt this software version for our study. Figure D-1 shows the screen for the staff perspective model used in this study.

**Step 1: Select criteria for rating alternatives**

Double click criterion to add it

Currently chosen ratings criteria:

- 2 Usability
- 3 Accessibility
- 1.1 Scheduling
- 1.2 Time Saving

Select criteria to remove:

Remove Criteria

**Step 2: Add alternatives**

**Step 3: Define rating scale for each criterion**

**Ratings Table**

Display Options:  Category Names,  Category Priorities,  Both

Show/Hide:  Priorities Column,  Totals Column

Calculations: Synthesize, Synthesize whole model, Column Priorities

Manage Ratings: Copy Ratings Table to Clipboard, Clear Ratings Judgments, Revert to Relative Model

To rate an alternative with respect to a criterion, click on a cell then click the down arrow to display the Rating scale intensities for that criterion. Click to select the one you think applies. Move to the next cell by clicking with the mouse.

Alternatives	Priorities	Totals	2 Usability (0.6004)	3 Accessibility (0.0737)	1.1 Scheduling (0.1222)	1.2 Time Saving (0.0407)
Millenium	0.4169	0.8371	Above Average	Excellent	Excellent	Average
Mikal	0.1847	0.3708	Below Average	Below Average	Deficient	Below Average
Iris	0.3984	0.8000	Above Average	Above Average	Above Average	Above Average

Figure D1. Ratings model screen

What makes SD v3 so convenient for ratings models is that all the instructions are visible and in a sequential order (steps 1, 2 and 3) and in a single screen, as shown in Fig D-1. The authors were able to develop their ratings models with minimum instruction, just by reading the instructions on the screen. If you are going to be working with ratings models, SD v3 this is the version to use. Overall, in our experience, SD v3 is “much easier” to use and it is particularly useful for ratings models (“in ratings, it is really convenient”) while it still has a “vintage flavor” as indicated by one of the co-authors of this paper.