WEB APPENDIX

Web Appendix 1 Pre Study - Business Understanding

Observation Phase. The overall aim of the pre study was to gain business understanding. This was undertaken through observations and interviews. First, regarding the observation phase, the researchers thoroughly familiarized themselves with the complex service, identifying the key touchpoints across the customer experience through detailed observations at the head office branch and one other branch. Three researchers visited each of the key functional units including the service workshop, new and used parts, field service, new sales, call center, invoicing, finance and credit. During the site visits discussions were held with each of the heads of units, and with at least four employees from each unit. Two researchers shadowed employees from each unit. Detailed field notes, photographic records, and memos were undertaken. Following established protocol for qualitative data analysis (Glaser and Strauss 1967; Spiggle 1994) we allowed categories to emerge from the data.

Interviews. In addition to the observations and shadowing, interviews were conducted with 34 employees and 20 customers. The aim of the interviews was to help us understand the customer experience from the informants' perspective, what activities they engage in across all the customer touchpoints, and the nature of interactions across the organization as well as interactions with other suppliers. Semi-structured interviews provide an effective means of obtaining rich insights into the phenomenon of interest (McCracken, 1988).

Interviews were conducted until information redundancy was achieved (Lincoln and Guba, 1985). Both employee and customer participants were asked to tell their story in their own words. Following established procedures (Reissman, 1993), deeper questions were asked about what the experience is like, what problems they encounter and why they believe this occurs, and what they see as their role. Moving from general questions to more specific, we asked what employees and customers do (activities) and with whom they interact, the nature of the interactions, and what they believe is good about their interactions and what could be improved. Interviews were obtained across all of the key categories, including construction, mining, earthmoving, landfill, waste management and recycling, scape and demolition, crushing and screening, and plant equipment hire. Pain points are centered primarily on pricing, process adherence, parts and communication. Of particular significance was that while viewing the overall experience as positive customers also articulated problems at various touchpoints in their journey. For example, in the below comment the customer while having a positive sales experience complained about the parts. For instance, "*Our experience with them, at the start was really good, they'd come in they promoted their products ... And the experience was really good there, all the specs, everything that we wanted to modify, certain bits that we need on our job specification they adapted. We had to have specialist equipment ...and different applications for the work we do, and they adapted it and came back with it. So that was a really good ...but on delivery, it was missing, some of the parts were missing, we've had to reach out.*"

The pre study demonstrated that customers had mixed experiences, that is, they were satisfied with a particular touchpoint but dissatisfied with others. This suggests that organizations need to drill down on individual touchpoints in order to understand the sources of pain.

Illustrative Examples of Customers' Experiences from the Pre Study

Parts	*"Obviously they sell a good product in my opinion. I think at times some of the backup from product support could be a little bit better, prompter, and come back with answers instead of questions, you know, and really, I should be the one asking the questions, they should be the ones coming back with the answers. Recently I wanted to order some parts - replacements, and the guy couldn't make the decision to the question. It was awful. Sent them an email best part of three weeks... he's not come back to me and I've sent him an email didn't just resolve it as quickly as they should have done."* [Quarry company A]
Pricing value	*"...they couldn't repair it, at the end I found out they were waiting on a part but didn't relay that information back to myself, the owner. If they were waiting on a part and they tell me it's going to be two days, I can't wait, I'm sorry... And they didn't relay the information back... and that's very poor and that was only because of my good relationship with [my] customer, that things get smoothed over, that lost me a week's hire that's loss in the money and loss in the revenue... poor information, poor communications with [participating organization]. The other complaint I've got is they're very, very expensive and not competitive.*[Hire equipment company]
Process Adherence	*"Liaison between some of the departments sales to financial, sales to accounts department. Things happen quicker than the system, it seems to put them in place. ...where we've pre-planned a situation where we're buying the machine, pre-pay them. They say "I'm sorry, you missed the pay date it'll be in in three days or next week", "But, you've promised", "Oh well, sorry we do it Tuesdays and Thursdays". And it's happened four times now, so on the last meeting we got last week... That was it, three o'clock, we haven't been paid, the machine had gone on our low loader, we paid them 200,000 and they owed us 60 or something. "No, sorry with... next one will be Friday]". And that was three or four o'clock I rang XXX, quarter past five, this is my account, when you know, the particular advance, that's not possible, they will do it, next one's Friday."* [Quarry company C]
Communication	*"The ideal customer experience for me is getting an honest and true reflection of what the problems are when I've asked them. I don't want to be soft-soaped, I don't want to be told everything will be fine, I want to know exactly what's wrong straight away and that's what XXXX do, is to tell me exactly... and they give me options"* [Landfill company]
After Sales Service	*"Our experience with them, at the start was really good, they'd come in and promoted their products, they've captured the market... And the experience was really good there, all the specs, everything that we wanted to modify, certain bits that we need on our job specification they adapted. We had ordered specialist equipment...different applications for the work we do, and they adapted it and came back with it. So that was a really good... but on delivery, it was missing, some of the parts were missing, we've had to reach out. So the after sales was not as good."* [Construction company]

Web Appendix 2. Illustrative Examples of the Initial 100 Comments

Comment	Overall satisfaction score
Yes I do,when we have a problem with one of my [competitor machine] and need to ring [competitor], 70% or 80% of the time when they come they have 2 or 3 parts with them and normally sort everything out on one day, with [company] they like to trouble shoot,charge more.	10
No not in the parts, however I think there is not much contact with [company] reps as they used to be. You know we had our local salesmen 8 to 10 years ago and our managing director is a very personal type of fellow. We know who to contact but…	10
I did enquire on three separate occasions with [company finance] and haven't heard back. My friend who owned a [machine type] was interested in buying from him asked them to do an inspection on the undercarriage and I don't think he heard back from them.	10
I've only got one gripe with [company] and I've had it for the past 2 years, with the [testing], since I've signed up for that I'm getting phone calls and emails about it but I haven't got any results back yet and I've constantly gotten in touch with [company].	10
Happy with the fitters but not with the admin/office side. Information is lost and things take a long time to get processed. Look after the guys who are working in the field. They are doing a brilliant job. The admin/office to fitter needs better communication.	10
Could improve online parts store, if the item is not available in [country and country] contact dealer must specify location of parts. Change contact dealer to where the availability of the part is and you don't have to call… 24/7. Service of phone could improve.	10
Everything was running smoothly with the service work until I went to pick it up. When I got there, the part had disappeared - they said it was on the back of a service truck which had gone out. I had to wait there for three hours as there was no point…	10
While the machine was in for service, a fan belt was changed. Since then, the fan belt has been changed three times. The fan belt is still not working. I am disappointed with my service from them. When I put a machine into them, I expect it to be right.	10
No not really I find them very good, they are very quick to respond to breakdowns and they are very quick to phone you back if there are any problems.	10
No I'm very happy with them, no problems. We've had a great relationship over 40 years. I worked for the company before they were XXX so it's like a family job anyway.	10
It would be more beneficial if they could make their workshop service costs more competitive and more in line with what is the industry standard and a loyalty discount applied for the fact that we have been a customer for so many years.	9.67
I think the service is very very good at the moment, only problem has been in last couple of months that some of key service technicians were missing. But even if they cannot help you with the first visit, they keep you informed and try to solve the problem.	9.67
[type] machine took back on November, had problems twice a week same problem. [company] got let in the dark by [company] that there is exactly the same issue with 3 other machines at other locations. [company] could not have known about this problem.	9.67
Lower the prices. Environmental charges- Don't charge for consumables such as gloves. If we supply them on site then we don't expect to pay for that. I don't like being charged to put rubbish in our own bins which I let them use. Other than that I'm happy.	9.33
It's quite frustrating that when you arrive at [company], you have to go through security. Most [XXXXX] just require you to sign for parts. But [company] requires you to sign in for security reasons, sign for parts and then visit security.	9.33
They should have something like a code on the sensors we buy. Because if it is the wrong one and we send it back there is always an argument that the parcel was opened and they don´t know if that sensor in the retuned parcel is the new one they sent.	9.33
Nothing. The only thing that we were a bit disappointed with is to do with repairs. It seems that every time they come out its over $1000 in service. The fitters seem to be struggling with diagnosing the issue and it always seems to be more expensive.	9.33
No the service was fine. The only problem I've got with [company] is they are saying we will be liable for the repair and they are using some small print on a contract for what we are claiming was a warranty issue. We are in a debate about it.	9
Part Service is the best part of [company] and that one I will rate very high. However workshop costs a lot of money and is a waste of time. The problem is that [company] is only interested in doing business with big companies and doesn´t care about small one.	9
Not really. Couldn't fault anything really. Every now and again its a bit difficult to get someone out but you can't really blame them for that could you.	9

Web Appendix 3 Text Mining Model Development

Library of Concepts Development. In the first phase we carried out the training set on the one hundred manually coded dataset to build a library of terms, using IBM SPSS Modeler software (data and text mining platform). We then grouped the terms under the customer experience elements. While, computer science researchers focus on building algorithms, as marketers our focus is on linking these elements in the customer experience to specific details that matter to customers. During the assigning of the comments in the IBM SPSS Modeler software, single words (uniterms) and compound words (multiterms) are identified to build the library. In addition, we used synonyms to resolve the issue of misspelled concepts and concepts having the same meaning (e.g., ''machiens-'' and ''catalugue'') (Singh, Hillmer and Wang 2011).

Linguistic systems are knowledge-sensitive; the more information contained in the linguistic libraries (dictionaries), the higher the quality of results. Therefore, a detailed understanding was needed because of the specialized vocabulary used by the customers. Modification of the dictionary content, such as synonym definitions, can simplify the resulting information and focus attention on the most relevant domain-specific concepts. In total, our library includes 435 terms of different resources (such as workers, sites, service engineers, parts delivery system, workshop, service depot, engines and oil pump). Regarding activities, we identified 458 relevant word phrases (such as call out charges, courier deliver the parts, pick up parts, ordering parts). Interestingly, we found that some customers compare the organization-related resources and activities with other competitors. In particular, many customers used comments such as: buying parts from other manufacturers, competition will offer experienced technicians, other suppliers offer better rates, etc. The first comment in Web Appendix 2 demonstrates these comparisons "…when we have a problem with one of my [competitor machine] and need to ring [competitor], 70% or 80% of the time when they come they have 2 or 3 parts with them and normally sort everything out on one day, with [company] they like to trouble shoot, charge more". Therefore, we considered competitor resources and activities to be essential elements in the library development. Discrete Emotions were another key element in the library development to uncover the positive, negative, neutral. Customers expressed their emotions in many forms such as joy, love, sadness, surprise. For example, as shown in Web Appendix 3 some customers were frustrated with the parts service, for instance, "It's quite frustrating that when you arrive at [company], you have to go through security (Figure 2). Interactions are another key component, as the customer experience originates from a set of interactions between a customer and the company. We identified 41 interaction terms (e.g. "inform the customer", "follow up and communication", "working relationship"), and 25 interaction duration terms (e.g. "in the last couple of months", "3 to 4 weeks"). Some customers know their active role and offer suggestions to improve the service experience. We identified 132 suggestion terms (e.g. "they should be chasing parts", "they should lower the price", "They should have something like a code on the sensors we buy"). We captured 356 contextual terms. This stage is one of the most challenging in the text mining development because it includes situational contexts that can effect a customer's experience positively or negatively (e.g. "better pricing strategy", "charge more", "available weekend service", "correspondence", "necessary future service visit" etc.).

Parts of Speech (POS). The library development took into account that languages contain ambiguities. That is, the same word can take different forms of speech (such as

nouns, pronouns, verbs, adjectives, adverbs, etc.), and therefore have different meanings. Furthermore, the same word, even when used as the same part of speech, can have different meanings depending on how it is used in the context. First, we used Parts of Speech (POS) technique in the IBM SPSS Modeler to extract compound words and recognize a clause or a sentence structure. POS includes grammatical elements, such as nouns, adjectives, past participles, determiners, prepositions, coordinators, first names, initials, and particles. A series of these POS elements make the pattern extraction follow the manual coding recommendations. Second, we developed patterns based on the relationships between the different customer experience elements (e.g. resources, activities, discrete emotions, etc.).

Macros development. From a linguistic perspective, some "literals" or "word strings" were important to the analysis, while others could be excluded. Following Tsytsarau and Palpanas (2012)'s lead we developed 22 macros. These macros help simplify the appearance of literals and word strings requiring extraction (i.e., identification of adverbs, pronouns, and prepositions). In some cases, these literals are not important to the patterns' extraction output and thus were included and presented as <Unkown> type or excluded from the analysis.

Linguistic patterns development. In total, 213 linguistic patterns were developed across the different service processes (field, parts, workshop, sales, control center, invoicing, finance and credit and overall satisfaction) and customer evaluation (compliments, complaints and suggestions). Finally, the patterns were automatically mapped to the set of root causes based on the manual coding process and used to classify and score the text for each record. The root cause is defined as the source of the problem identified in the customer comments about the received service, seen primarily in complaints (Antony 2006). We modified the linguistic resources, re-extracting the text, reviewing the results, checking back with our definitions of the linguistic resources (terms, synonyms, elements, libraries, etc.) in order to further refine the categories.

Web Appendix 4. Process Used to Predict Customer Satisfaction in the Absence of a Traditional Measure

Predictive model (CHAID classifier). We developed a classifier to enables firms to predict customer satisfaction fairly well in the absence of such a traditional measure.

How it is calculated. A sentiment score for each comment was calculated where C_{score} is the comment's overall score, C_p is the number of positive comments, C_n is the number of negative comments and C_s is the number of suggestions given in a particular comment by a customer. As a result of the possibility of multiple survey entries (n) per customer, a sentiment score (C_{SC}) had to be calculated for each customer. Then, we created a new field labelled *Customer_Satisfaction_Status* using a binning technique (+/-1 mean and standard deviation) to categorize comments into main three categories: satisfied (C_{score} =1), complainter (C_{score} = -1) and neutral (C_{score} = 0).

$$C_{score} = C_p - C_n - C_s \qquad (1)$$

$$C_{SC} = \frac{C_{score}}{n} \qquad (2)$$

Our approach can predict customer satisfaction status using a classification modelling technique, sometimes referred to as supervised learning in machine-learning communities. Predictive variables (for instance, in our data they are region, store name, dealer division, complaint root cause categories, compliment root cause categories and suggestion root cause categories) are used to predict the values for the target field *Customer_Satisfaction_Status*. Our predictive model employed the Chi-square automatic interaction detection (CHAID) technique (Kass 1980; Magidson 1994) to predict whether customers are satisfied, neutral or a complainer. CHAID splits the sample into a series of subgroups that share similar characteristics called a "decision tree". First, a training set, 60% of the entire data, was used to develop a training model. Then we tested the model against new data (40%). The model was fine-tuned to decrease the error of false predictions. These two steps are performed to ensure the repeatability and validity of the prediction model. The table shows the output of the coincidence matrices, which show the pattern of matches between each generated (predicted) field and its target field for categorical targets. Then we calculate the proportion chance criteria for each category following Morrison (1969) and then calculate Cpro (71%) as below to benchmark and evaluate our model accuracy results. Our model outperformed Morrison's proportional chance criterion (71%) by 7%.

$$Cpro = \alpha * \xi + \beta * \gamma + \lambda * \zeta \qquad (3)$$

Predicted/Target Fields	Complainer	Neutral	Satisfied	Total	Proportion
Complainer	81	102	0	183	0.10938434
Neutral	53	1223	18	1294	0.773460849
Satisfied	0	183	13	196	0.117154812
Total	134	1508	31	1673	
Proportion	0.080095637	0.901374776	0.018529588		

Web Appendix 5. Cognitive Responses: Predicting Customer Satisfaction –without Measuring Overall Satisfaction; Illustrative Examples from 'Complainers'

Comments	Overall satisfaction score	Predicted target variable- Complaint_Status
Nothing. The only thing that we were a bit disappointed with is to do with repairs. It seems that every time they come out its over $1000 in service. The fitters seem to be struggling with diagnozing the issue and it always seems to be more expensive	10	Complainer
Delivery time is actually insufficient. Not guaranteed delivery of next day. Charges are excessive for delivery. Not guaranteed next day delivery.	10	Complainer
COST IS TOO HIGH	10	Complainer
The only thing is we had an instance maybe 6 or 7 months ago, we ordered some spare parts for the machine, we went over our credit limit they didn't process the order but if someone said it on the day we would have paid, this was due to the accounts office.	10	Complainer
Didn't have parts on first visit. Better communication. Logged every comment Taking parts with them	10	Complainer
There is equipment that we have that still has not been fixed. It is too costly to continue to call [XXXXX]for a problem that still persists.	9	Complainer
They should have a look at their prices. [XXXX] is one of the most copied companies, and this is hurting their sales. If they want to fight back, they must cut the costs. 10-15% lower prices would help a lot.	8	Complainer
We had ordered the part, but it was the wrong part. It wasn't our fault as the pump had changed. So we had to pay double postage. That was the only downside really.	10	Complainer
The [XXXXX] depot doesn't hold a lot of stock, have to get it out of [XXXXX] [couldn't quite understand accent but sounded like this city], [XXXXX] could hold a bit more stock.	10	Complainer
They're too expensive for labor, there not enough mechanics to cover the area. Sometimes you could wait 2-3 days for a mechanic and waiting the same length of time for parts.	8	Complainer