The Construction Department at Croq'Pain

Introduction

PARIS, FRIDAY, JULY 7, 1995 – Michel Boutillon was having a bad day. He had just called his wife to tell her that their week-long trip to the Riviera would have to wait a little while longer. His company's president, Jean Gerard, had just asked him to make a presentation to top management the following Monday. Michel, a graduate of the Marseilles Institute of Trade, had been hired two years earlier to be a "transition manager" at Croq'Pain, a chain of quality fast-food restaurants. He was responsible for getting new restaurants ready to open after construction was completed. He also had been asked to develop a better system for the selection of locations for new stores. The new system was to be based on a statistical model. Michel was originally given two months to come up with a proposal but, apparently, Gerard did not have the patience to wait that long. Michel was not surprised because the mid-year revenue figures for all the Croq'Pain stores had arrived earlier in the week. These figures showed that the performance of eight of the ten stores that opened in the first half of last year were less than satisfactory.

The Company

Jean Gerard founded Croq'Pain in 1981 and opened his first "restaurant rapide" on the "Parvis" de la Defense, the main business center on the outskirts of Paris. This first store was extremely popular among the business clientèle there as well as with the shoppers and visitors to the CNET (a large exhibition hall in the middle of the center). Going after the student clientèle, he opened his second restaurant six months later on the Boulevard St. Michel in the middle of the Latin Quarter, the students' section of town. Other restaurants, located in different parts of the capital, were opened during the next five years. In a 1986 interview with a local business magazine, he said that he saw his stores as the French answer to the American fast food invasion. Indeed, in the early eighties, many fast food chains had set up shop in Paris and other French cities, and most were based on American models. McDonald's and Burger King had already opened in Paris, and a number of French look-alikes had mushroomed as well. His goal, he said, was to offer quality food ... fast, not fast food. By 1987, Croq'Pain had 15 stores in Paris, Toulouse and Marseilles.

In 1987, poor financial results at some of the stores prompted Gerard to conduct a large marketing survey among his customers. The results forced him to re-assess the company's marketing strategy. The survey (shown in Table

6.24) revealed that the bulk of the customer base was made up of professionals and baby boomers (now in their late thirties and early forties). He concentrated new stores in areas that would serve this clientèle and moved away from the student neighborhoods, in effect withdrawing from the competition with other fast food chains. Croq'Pain stores were opened in more cities, but were concentrated in the downtown areas and the business centers. This strategy paid off, and Croq'Pain's expansion continued at a steady pace. In January 1994, the company owned 50 stores throughout France. The expansion continued particularly strongly in the first half of 1994; ten new stores were opened during this period alone.

All store openings were controlled by the Construction Department of Croq'Pain. It was responsible for selecting the location of new stores and coordinating their construction. It was also responsible for supplying and installing all of the equipment necessary to run the restaurant. Management of the store was passed to the store manager "clef en main" – the day of the opening, the store manager was literally given the keys by the transition manager. The store was ready to do business the same day.

The Croq'Pain Concept

The very idea of fast food goes against everything the French culinary culture stands for. Not too long ago, it was common for most workers to take a two-hour lunch and go home to eat what is still regarded as the main meal of the day. But Gerard recognized that more and more workers, especially around Paris, were commuting from towns too far away to get home in the middle of the day. Increasingly, they were eating lunch on or around the job.

Croq'Pain took advantage of this change and offered a range of sandwiches, salads and pies. Among other items, it serves baguette sandwiches. Among the main baguette items, one finds the campagnarde (paté), the tout-jambon (ham with butter), and the complête (eggs, tomatoes, lettuce, and mayo)) baguettes. It offers a selection of quiches (mushroom, ham, three-cheese, onion pie among others), salads (nicoise, tuna, or lettuce), yogurts and cheeses. Drinks include bottled water, soft drinks, red and white wine as well as ten different kinds of beer. Gerard did not aim to offer the lowest prices but rather a good mix of quality food, based on French traditions, and price.

In addition to providing good quality food and convenience, the stores quickly developed a unique look: black-and-white checkered tile floors; red and white counters; "French café" style tables and wood chairs; and black sidewalk tables with red umbrellas.

The Construction Department

The Construction Department, in charge of opening new restaurants, employs 40 people, including architects, lawyers, designers, accountants, and teams of workers involved in different stages of the actual store construction. The process of launching a new restaurant begins approximately one year before the restaurant's scheduled opening date. It includes the following steps:

1. **Choice of location:** The city and location of the new store is selected. At this stage, the company also determines the investment needed to open the store. The investment includes building and land as well as equipment.
2. **Property acquisition:** The building or land is purchased (or possibly leased, in some cases), and all necessary permits and licenses are obtained.
3. **Design:** The architects design the new store, a step that is begun during the property acquisition stage but is finalized at this stage.
4. **Remodeling and/or building:** The actual construction of the store, by hired contractors, takes place.
5. **Logistics:** Prior to the restaurant opening, the transition manager steps in to oversee logistical problems, such as installing the proper equipment, setting up a local supply chain, and hiring staff.
6. **Opening day:** In a morning ceremony, the transition manager passes the key to the store manager (Jean Gerard has never missed a store opening), and the restaurant opens the same day.

After opening day, the store is in the hands of the store manager and the transition manager moves on to his/her next assignment as soon as the store is opened. The store managers have complete control over their store thenceforth. In particular, they frequently adjust the workforce during the year in response to the store's variable workload and financial results. They can also, to a much lesser extent, adjust the store's operating hours.

The location selection step is critical. The decision made at this point, to a large extent, determines the company's future earnings. So far, determining the store's location (as well as its size) has been an imperfect art, and several attempts have been failures. At its current high rate of expansion, the company has a growing need to standardize the location selection process and minimize the risk of failure.

The usual procedure for choosing a location has involved sending a "location expert" to choose several possible options. The expert would then make

an estimate of the earnings potential of each location followed by a recommendation to the company's president and the director of construction, Didier Marchand. A location was chosen by this panel based on the expert's estimates and management's opinion.

Developing a Model for the Selection of Store Locations

Soon after he was given responsibility for developing a model to help select new locations for stores, Michel gathered a team that included the location selection experts and asked everyone to devise ideas for the structure of the model. The independent variables of the model were to be those variables that they thought would influence the profitability of a new store. The list established by the team is presented in Table 6.25.

Following the team's recommendations for the model parameters, Michel collected the data for all stores, up to and including the ten stores opened in the first half of 1994. (Data for stores opened afterwards is not complete and thus could not be included.) This data is shown in Tables 6.26. Also included are the operating earnings figures for the period July, 1994-June, 1995. He proceeded to run a regression of the earnings figures, using all of the parameters of the model (results are shown in Table 6.27).

He was not pleased with this first result and needed to improve on the initial model. To begin with, he did not like the choice of certain parameters. They had little value for predicting financial results because they could not be known in advance. Second, he thought that some of the "home made" parameters had been recommended because they were used by the experts but, in fact, they were of little use. Overall, he was beginning to have serious doubts about the feasibility of such a model-based approach for selecting store locations.

Once he looked at the results from his regression model, he felt quite uncomfortable with what he saw: some of the regression coefficients did not make sense, and many were not statistically significant. Clearly, this regression model needed improvement.

Second, he thought that a good way of testing the applicability of the regression model was to consider what would have happened last year, had the model been used to evaluate and select the 1994 store locations. In order to do that, of course, he would have to amend the model by using only the data obtained for the first 50 stores. Then, he would use this regression model to evaluate the ten stores that were opened in 1994.

Croq'Pain's goal is to have a 16% return on invested capital after taxes. As it turns out (after some laborious computations using a method called discounted cash flow analysis), this is equivalent for our purposes to a ratio of Operating Earnings (EARN) to invested capital (K) of 0.26. Therefore, Croq'Pain defines their "performance ratio" for a store as:

$$\text{Performance Ratio} = \frac{\text{Sales} - \text{Variable Costs}}{\text{Invested Capital}} = \frac{\text{Operating Earnings}}{\text{Invested Capital}}.$$

The target performance ratio is 0.26, i.e., 26%.

Michel wondered which of the ten stores would have been opened, had the model been used to predict the performance ratio of these stores.

Third, he needed to consider his recommendations for new stores for 1996. The experts had so far made a list of ten potential locations (see list in Table 6.28). He wanted to use the model to help him select the potential locations of stores to be opened in 1996.

He also contemplated if his analysis could be parlayed into a different way to think strategically about the way Croq'Pain plans to grow its business.

Finally, after all this, he needed to prepare his presentation to the executives using very definitive arguments. Jean Gerard did not like "maybe's." If Michel decided to recommend against using a regression model for selecting locations, he would have to defend this decision and offer possible improvements to the existing methodology. If he decided to recommend using the regression model, he also would have to offer strong arguments because the company would be far worse off with a bad model and no experts than it is now, with no model and experts who are sometimes wrong. In addition, he would have to point out possible shortcomings of the model methodology.

Michel felt a little better having spelled out his approach, but he knew that it was going to be a long weekend. He closed the door to his office, unplugged the phone, and went to work.

Assignment:

Using the data for this case, provided in the spreadsheet file entitled CROQ-PAIN.xls, do the following:

(a) Examine the operating earnings regression model output obtained from the 60 stores, as shown in Table 6.27. Try to improve the model by eliminating certain independent variables or by making any other changes that

you think make good sense. You should strive for a model that is simple (i.e., has few independent variables), that does not violate any of the basic assumptions of multiple regression (e.g., multicollinearity, heteroscedasticity), but nevertheless has good predictive power.

(b) Michel thinks that a good way to validate the model obtained with data from the 60 stores is to see how a similar model, obtained from the 50 stores opened before 1994, would have performed in predicting the performance of the last ten stores opened. Step back one year, prior to the opening of the last ten restaurants. Amend the model you have developed using only the data from the first fifty stores. Using Croq'Pain's performance ratio target of 26%, which of the ten stores would you have opened in 1994?

(c) Croq'Pain's strategic planning group has developed a list of ten potential store locations for 1996 shown in Table 6.28. Which of these locations would you select, i.e., which locations meet or exceed the performance ratio? Use the most complete model (60 restaurants) for your analysis.

(d) Prepare a memorandum containing your recommendations as to whether, and how, regression models can be used in the process of location selection. Defend your recommendations with a discussion of the relative strengths and weaknesses of regression models in this setting.

Sample size	1,150
Males/females Split	
Males	72%
Females	28%
Age distribution	
under 15 yrs old	2%
15-24 yrs old	12%
25-34 yrs old	16%
35-44 yrs old	55%
45-54 yrs old	13%
over 55 yrs old	2%
Family status	
Single	36%
Married	64%
1 child	8%
2 children	25%
3 children and above	9%
Employment	
Not employed	30%
Employed	70%
Current Status/Activity	
Student	17%
Blue collar	8%
White collar	55%
Other	20%
Visits	
Less than 1/month	15%
1-5/month	14%
5-15/month	45%
15-25/month	25%
more than 25 times/month	1%

Table 6.24: Summary results of a 1987 marketing survey that was conducted among customers of Croq'Pain between April 1, 1987 and May 15, 1987. The survey was conducted at all Croq'Pain locations.

Variable	Units	Description
EARN	$1,000	Operating earnings: annual sales minus annual operating costs. Operating costs exclude the fixed costs of property rent and equipment rental (all capital equipment is purchased by headquarters and rented to the stores). Operating costs include variable costs such as salaries, utilities, supplies, inventories and other expenses.
SIZE	m^2	Size of store: Total area inside the store.
EMPL		Number of employees employed by the store as of Dec 31, 1994.
P15		Number of 15-24 year-olds in a 3 km^2 radius around site.
P25		Number of 25-34 year-olds in a 3 km^2 radius around site.
P35		Number of 35-44 year-olds in a 3 km^2 radius around site.
P45		Number of 45-54 year-olds in a 3 km^2 radius around site.
P55		Number of persons above 55 in a 3 km^2 radius around site.
total		Total population in 3 km^2 radius around site.
INC	$1,000	Average income in town or neighborhood around site.
COMP		Number of competitors in a 1 km^2 radius around site. Establishments considered as competitors include fast food restaurants, bars and cafes equipped providing lunch service.
NCOMP		Number of restaurants that do not compete directly with Croq'Pain in 1 km^2 radius around site.
NREST		Number of non-restaurant businesses in 1 km^2 radius around site.
PRICE	$\$/m^2$/month	Monthly rent per square meter of the retail properties in the same locale.
CLI		Cost of Living index. Measures the cost of living in the immediate vicinity to the restaurant site. Aggregate of average cost of living index determined by the commerce department and additional economic measures taken by experts on site.
K	$1,000	Capital invested in the store. This amount is exactly equal to the purchase price of the property (or the lease, in some cases) plus the cost of all equipment and the cost of remodeling the space.)

Table 6.25: Parameters for the regression model. The parameter K, i.e., the capital invested in the store, is not included in the model. All French monetary units have been converted to US dollars for the purpose of this case.

STO	EARN	K	SIZE	EMPL	total	P15	P25	P35	P45	P55	INC	CO	NCO	NRE	PRICE	CLI
1	28.3	861	129	14	8,580	980	1,280	560	1,000	3,100	27.6	8	1	45	16.10	129
2	-1.5	630	91	12	8,460	1,290	720	1,200	1,490	3,100	28.3	2	2	27	11.40	116
3	68.9	1,074	140	13	19,250	2,940	2,490	3,710	4,030	5,270	30.2	5	4	5	21.70	142
4	202.1	882	184	7	20,920	3,570	4,930	4,420	4,300	2,960	27.6	2	1	7	11.80	138
5	115.8	931	144	14	11,660	1,700	1,140	2,200	2,140	2,630	33.9	1	3	25	16.60	126
6	221.7	1,185	160	11	25,780	4,640	3,150	5,720	5,330	5,920	32.5	3	9	8	22.10	137
7	292.9	907	94	5	19,000	3,600	2,330	4,750	4,970	3,030	33.1	0	11	89	24.30	134
8	134.4	764	100	8	18,500	3,450	2,560	3,630	3,520	4,800	29.7	3	3	14	16.40	132
9	37.4	643	85	14	14,210	1,930	4,280	1,740	2,060	2,960	28.4	4	12	43	12.90	129
10	181.0	666	92	6	17,440	3,520	1,780	4,350	4,020	3,470	28.3	8	1	76	13.00	117
11	246.9	1,245	167	12	22,360	3,970	2,810	4,540	4,770	4,700	38.3	3	10	9	22.80	136
12	178.3	846	199	15	20,360	3,190	3,610	4,380	4,150	3,670	32.1	6	3	11	10.10	121
⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮	⋮
43	94.1	597	76	16	23,180	4,050	2,430	5,060	4,980	5,400	31.0	6	13	19	11.70	134
44	214.2	643	144	14	21,830	3,920	2,810	4,260	4,330	5,970	30.0	1	11	26	7.60	112
45	63.3	761	87	17	22,220	3,230	4,890	3,990	4,050	5,270	25.5	2	3	32	18.70	128
46	237.1	570	73	6	26,700	5,150	2,520	6,280	5,910	6,490	35.2	8	3	14	10.50	134
47	208.8	553	59	11	19,920	3,450	3,990	4,090	4,110	2,760	34.4	7	6	71	11.70	116
48	110.6	861	83	13	26,200	4,070	4,970	5,360	5,190	5,710	29.5	4	10	44	25.00	116
49	165.4	714	125	7	20,550	2,800	3,820	3,370	3,650	5,260	33.8	3	10	12	11.30	122
50	-11.4	575	56	4	14,260	2,150	3,030	2,360	2,240	3,800	29.9	2	5	12	14.10	127
51	216.3	776	146	11	17,440	2,800	2,350	3,180	3,050	5,490	32.1	2	6	26	11.60	124
52	65.7	648	62	11	12,880	2,020	1,780	2,810	3,000	2,010	32.7	7	7	70	18.00	125
53	67.6	690	96	9	14,310	2,320	1,040	2,420	2,770	4,380	30.0	1	6	7	13.60	134
54	127.9	715	86	10	12,990	2,480	2,380	2,530	2,670	1,420	34.4	3	5	17	16.50	122
55	82.9	650	88	8	16,380	1,870	3,290	2,520	2,660	4,390	28.8	3	3	16	12.80	134
56	-2.9	788	72	7	21,360	3,310	3,590	3,730	3,970	5,450	28.7	2	8	10	24.30	129
57	247.7	782	119	7	23,400	3,620	3,820	5,680	4,260	6,060	33.4	2	10	63	13.30	121
58	343.0	1,558	285	8	22,830	4,160	1,230	5,120	5,200	5,670	27.6	2	3	40	18.30	116
59	193.1	936	193	8	13,510	1,950	2,360	2,310	2,320	3,480	28.7	1	9	34	12.50	112
60	277.5	688	92	12	25,490	4,890	1,800	6,070	5,960	5,890	36.0	1	8	31	14.10	127

Table 6.26: Data on Croq'Pain stores. Only stores having been in operation at least one full year are shown). Stores 51-60 have opened in the first half of 1994.

SUMMARY OUTPUT						
Regression Statistics						
Multiple R	0.931					
R Square	0.867					
Adjusted *R* Square	0.826					
Standard Error	38.126					
Observations	60					
ANOVA						
	dof	SS	MS	F	Significance F	
Regression	14	426750.607	30482.186	20.970	0.000	
Residual	45	65411.117	1453.580			
Total	59	492161.724				
	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-364.267	98.345	-3.704	0.001	-562.345	-166.190
SIZE	0.771	0.099	7.803	0.000	0.572	0.970
EMPL	-0.866	1.466	-0.591	0.558	-3.818	2.086
total	-0.010	0.013	-0.805	0.425	-0.036	0.015
P15	0.057	0.028	2.050	0.046	0.001	0.113
P25	0.013	0.013	0.978	0.333	-0.014	0.040
P35	0.014	0.022	0.658	0.514	-0.030	0.059
P45	0.001	0.033	0.032	0.975	-0.065	0.067
P55	0.010	0.014	0.727	0.471	-0.018	0.039
INC	8.763	1.644	5.331	0.000	5.453	12.074
COMP	-2.681	2.320	-1.156	0.254	-7.354	1.992
NCOMP	-0.347	1.561	-0.222	0.825	-3.490	2.797
NREST	1.451	0.245	5.920	0.000	0.958	1.945
PRICE	-3.173	0.966	-3.283	0.002	-5.119	-1.226
CLI	0.402	0.700	0.574	0.569	-1.008	1.812

Table 6.27: First model run: operating earnings model based on 60 stores.

STORE	K	SIZE	EMPL	total	P15	P25	P35	P45	P55	INC	CO	NCO	NRE	PRI	CLI
Calais	660	54	–	6,710	600	2,570	430	690	1440	38	4	5	18	22	131
Montchanin	733	120	–	11,040	1,300	1,400	2,110	1,090	2,680	31	7	6	21	13	115
Aubusson	1,050	135	–	11,910	2,210	1,850	2,330	2,240	2,170	29	1	4	13	22	135
Toulouse	836	245	–	11,350	3,400	3,000	2,570	1,200	1,350	37	5	8	62	13	136
Torcy	784	96	–	3,500	260	700	500	1.200	2,000	30	12	7	38	18	130
Marseilles-1	925	197	–	12,720	1,650	1,960	2,300	1.780	4,390	23	1	9	41	12	136
Marseilles-2	1,090	93	–	16,660	2,570	2,940	2,820	2,720	4,450	25	2	0	5	33	133
Clermont	738	169	–	9,410	780	1,940	880	1.080	3,450	30	4	4	11	9	126
Montpellier	584	149	–	19,020	2,500	2,680	4,600	4,567	3,000	29	4	5	26	13	128
Dijon	681	150	–	12,650	1,650	1,320	1,000	3,400	2,370	35	3	12	54	15	128

Table 6.28: Ten new locations considered by the experts. Note that the column for the number of employees is blank. This is becuase the number of employees is decided and adjusted during a store's operation by each store manager.