Credit area: A study of credit policy practices and credit scoring

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THE CREDIT AREA: A STUDY OF CREDIT POLICY,
PRACTICES AND CREDIT SCORING

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B.S., Rensselaer Polytechnic Institute, 1971

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CHAPTER I
INTRODUCTION

Prologue

The cashless society is approaching a reality for many Americans. Transactions during any particular day may typically include use of the gasoline credit card, the bank card, and private retailer cards. The use of credit and the demand for it is increasing dramatically. An analysis of retail sales in September of 1974 revealed that consumer credit was in great demand and increased sharply, especially in the areas of auto loans, home repair and modernization, charge accounts, and service credit.\(^1\) In view of the increasing demand, the Interbank Card Association has been expanding its credit card availability into as many areas and industries as possible. For example, a mortuary has been seen to advertise a bank card in payment for services rendered.\(^2\)

To highlight the vast increase in credit demand and to illustrate how some agencies are coping with this demand, consider the following quotation from a recent issue of the Wall Street Journal:

"Both outfits (BankAmericard and Master Charge)"

hope to lure reluctant national department store chains into the fold."³

Other companies have used and are using the telephone for long distance credit. Gamble-Skogmo, for example, instituted a charge-it by phone procedure whereby a customer could establish credit by telephone.⁴ The company would check on the customer to determine whether or not credit should be extended or rejected or whether further investigation would be necessary. In the recent past, oil companies would mail their credit cards to graduating Seniors expressing the industry's trust in their ability since they were proven students and presumably good credit risks. Also, of course, this trust was aimed to provide substantial good will effects and open more credit accounts for the industry.

But even though credit is in great demand, and even though many organizations are willing to extend it, many consumers have found that they are experiencing accelerated financial problems because they have overextended themselves. It has been found that more people are requiring credit counseling to help them live within their means. Counseling is not restricted to just the lower classes as reports have stated that businessmen and other professional people are requiring the aid of counselors in ever increasing numbers.⁵

³Ibid.
The American economy is rapidly developing a credit economy. Witness the increasing numbers of retail stores providing vast quantities of varying services that offer their own personal charge accounts and credit cards as well as honoring the more nationally known bank cards. Witness the numerous lending institutions extending more and more consumer credit for personal loans, automobiles and so on. Human nature being as it is, many individuals prefer to purchase their goods new and enjoy the month lag (or whatever period that is agreed upon by the lending institution) prior to paying for the purchase, regardless of interest rates.

By observing the increased demand for credit in some form or another and observing its frequent use in everyday living, a question arises as to how this credit is extended. What policies do banks, stores, credit unions and so on use to judge whether credit will be granted? Credit and its extension to the consumer is the main topic of this paper. Human relations and management and organization will also be discussed as they relate to credit management. These intuitive and inherent management aspects of the credit extension process may perhaps be some of the most valuable, conclusive outcomes of the project.

The Problem

The central hypothesis of the study is that a standard credit policy exists which is particular to a specific geographic location, Great Falls, Montana. Although this policy
may also be applicable to many other geographic locations. it will definitely exist in and pertain to the Great Falls community and hence defines a credit area particular to Great Falls. The problem, then, was to ascertain the characteristics of this policy, if in fact it existed. Should a standard credit policy exist, then it will define a credit area.

In accomplishing the above mentioned objective, several goals had to be attained. First, the credit policies of the various lending institutions in the community were to be determined. At this point it would be appropriate to define what is meant by lending institution. For the purposes of this study, a lending institution was considered to be any organization (e.g. credit unions, retail stores, etc.) which extended credit to a consumer such that the consumer was allowed to purchase a good(s) at the current time and delay payment for that good(s) until a later time. The good(s) was considered to be any that might be purchased via credit card or loan (for example money borrowed from a bank will be considered as "purchased" now and "paid for" at a later time depending on the bank's current policies and interest rates).

After determining the policies of numerous lending institutions, these policies were analyzed for similarities, and frequency of occurrence to determine if a standard pattern existed. They were compared against a model that was
developed as a control in Chapter III of this study. The model that was developed was, in a sense, another goal of the study as it involved credit scoring techniques. Each individual loan officer was asked to give a personal opinion (which may be altogether different from accepted company policy) of which characteristic or characteristics were important in judging whether an applicant should be given credit.

The final goal was to determine whether there existed an optimum policy based on data collected from the various lending institutions.

Regardless of whether the hypothesis is proven or disclaimed, the attainment of the goals stated above aided in fulfilling the purposes of this paper. In essence, these purposes were to gain insight into the actual operation of daily business practices and policies; and to gain a better understanding of the managerial discipline and its affect on human relations. As much of this type of data is intangible and unquantifiable, it will not be recorded per se.

Background

Prior to exploring the specific questions concerning credit policy and credit scoring, it would be appropriate to briefly consider the basic background of which credit is a part.

From a broad view, one might consider working capital as a basic starting point. Working capital refers to an organization's short term investments in assets (i.e. cash,
short term securities, accounts receivable and inventories). Its management encompasses all interrelationships that exist among cash, short term securities, inventories, accounts receivable and the resulting decisions that must ultimately be made. Naturally, numerous organizational goals must be achieved, some of which are the following: (1) generation of a service or a product; (2) provision for efficient allocation of resources; and (3) attainment of a profit. These organizational goals, however, may not always coincide with those of the individual managers. Therefore, an arbitration path must be available to insure consistency between the organization and the individual to insure overall goal compat-

ibility.

A conflict in goal compatibility comes to mind immediately with the liquidity-profitability trade-off issue. How much should a firm hold in the form of current assets? If one considers holding a low proportion of liquid assets to total assets, then the firm's profit would be greater on total investment. However, the firm runs the risk of running out of cash in the event of an emergency. Or, a firm may decide in financing decisions to use short-term debt rather

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than long-term debt since short-term debt can be paid off on a seasonal basis during periods when it is not needed. Unfortunately, short-term debt poses problems in that interest rates may rise when a firm needs financing again. And, if the firm encounters serious troubles, it may find that it can not obtain the financing required because it has demonstrated a loss in part or in all of its credibility.

Thus a firm may have a goal of attaining great profits, yet face high risk in achieving that goal. This risk may be greater than management wishes to take. These dual, conflicting goals must be reconciled based on overall management and company objectives. In managing working capital, one must recognize the problems to be encountered in accomplishing goals such as attaining profit and limiting risk; the dynamic (inflow and outflow) versus the static (balance sheet) characteristics of money; the interrelationships between current assets and current liabilities; and finally, but also extremely important, the inherent uncertainties in future financial forecasts.

To this point, a rather broad subject has been discussed--working capital. As mentioned previously, working capital incorporates numerous facets not the least of which is accounts receivable. It is this consideration to which this

9Ibid., p. 385.
10Smith, op. cit., p. 18.
study is more broadly addressed. Accounts receivable policy is an area of managerial decision which ultimately determines the degree of the firm's investment in credit extension. The level of receivables is determined by two factors: (1) the volume of credit sales and (2) the average period between sales and collections.\textsuperscript{11} With regard to the latter, which is the firm's credit policy, thorough analysis is a must in determining how much risk the company will take. To this end the firm must consider three controllable aspects that are directly related to and influence its credit policy.\textsuperscript{12} First, a determination must be made as to the upper limit for maximum riskiness of accounts that are to be acceptable (credit standards). Risk-profitability trade-offs become apparent at this point. Should a firm accept all accounts in an attempt to enhance its profits while at the same time lowering its quality standards and thereby opening itself up to heavier bad-debt losses that could neutralize or destroy any profits obtained? Also, what of relaxed credit standards causing increased costs because credit departments must be expanded to handle the increased receivable volume? Because of increased volume of accounts and expanding credit departments, collection periods may have to be extended. What of the cost of tying up this capital?\textsuperscript{13} If a firm is

\textsuperscript{11}Weston, op. cit., p. 536.

\textsuperscript{12}Ibid.

\textsuperscript{13}Van Horne, op. cit., p. 442.
lucky and encounters absolutely no faulty or risky accounts, theory would say the accounts should be accepted as long as the profitability of sales generated exceeds the added costs of collecting receivables. 14

A second aspect which must be observed is the credit terms. Incorporated in the terms are the length of time that credit is granted (credit period) and discounts allowed during the credit period. 15 By extending the credit period sales may be increased, however, the trade-off of liquidity and profitability enter into the decision making because there is a cost of tying up funds in receivables.

The final aspect of the firm's credit policy is its collection process which incorporates the procedures a firm will follow to obtain payment of past due accounts. 16 Once again, an organization needs to carefully consider how far it has to go to obtain past due accounts, because lost goodwill and the cost of collecting these accounts may more than offset the profits that would have been earned.

Critics tend to blame the banks and other lending institutions for bad-debt losses. As an example, some have openly stated that banks should conduct more thorough investigations prior to granting credit cards. 17 After credit cards

14Ibid.
16Weston, op. cit., p. 539.
17Wall Street Journal, September 13, 1972, p. 38.
have been granted, those banks should continually review their records, set up consumer complaint boards and in general assume a tighter rein over the cards that were issued, and the methods by which they were issued. Other critics have charged that bad loans in the past involved weak credit risks. In fact, many bankers have agreed with this statement, yet also said that they would probably make the same choice based on the given information.\textsuperscript{18} Some loans were sound when first granted, but changing circumstances caused default. According to Robert Morris Associates, however, 30 percent or more of the loans that were granted were based on marginal credit risks and should never have been granted.\textsuperscript{19}

The point to be made is that extremely careful analysis is required for granting credit. Final decision must be made in light of current company goals. Collecting defaulted accounts because of faulty or hasty investigation practices may cost much more than those additional accounts were worth in profit estimation. A firm that spends a large amount of its time attempting to track down those who have defaulted may not be considered a creditable agency with which to do business.

\textbf{Summary}

By casual observation, it may be seen that the demand

\textsuperscript{18}Wall Street Journal, August 2, 1972, p. 4.

\textsuperscript{19}Ibid.
for credit is and has been increasing. Credit is a major factor in our everyday lives as most people have used and established credit in one way or another. Although stated in conjecture, it might be safe to say that many Americans possess and use a credit card in their daily business transactions.

From a business standpoint, credit is but a part of a vast managerial process of working capital policy which incorporates a multitude of interrelated, complex variables. Of these, accounts receivable policy is of special interest for it establishes the general and specific credit policies about which this study was concerned.

The objective of the study was to determine the existence of a standardized credit policy that would define the Great Falls area. In accomplishing this objective, credit scoring techniques were used as a comparator in determining which type of policies exist and, hopefully, which policy is the "best" if a best one exists.

The topics of optimum credit policies, credit scoring and practices along with current literature related to these topics will be the subjects of the following chapter.
Optimal Credit Policy

In the formulation of credit policy, the length of the payment period must be determined. Ideally, assuming no risk and sufficient working capital, the terms should be extended as long as profits from extra credit sales exceed added costs.

Several questions come to mind as to how the payment period is to be found, whether it is the best period available, and if it will lend itself to formulating the best credit policy. Also, what of the no risk assumption? It would seem that risk is one of many primary considerations in deciding upon a credit policy. To be sure it is. The "definition" given above concerning credit policy is an ideal generality that should theoretically prove true in the long run if risk could be avoided. However, risk is something that must be dealt with in credit extension just as the length of the payment period. These two aspects are analyzed in this chapter as well as uncertainty, optimum credit policies and credit scoring practices.

Much data must be obtained and reviewed to obtain the optimum credit policy (if, in fact, one even exists). For

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example, records should contain such information as revenues from credit sales to credit customers who pay their debts, the average number of credit orders per credit customer per time period, the average dollar amount of each credit order, percentage of delinquent customers, the present value of the profit from cash sales attributable to credit selling and much more.\(^{21}\) An equation may be formed and solved for a maximum or optimal number of applicants to accept. Yet even with a great deal of data and accurate mathematical model, one must know how to correctly use it to the best advantage. The credit manager should attempt to market his wares as efficiently as possible in conjunction with overall management objectives. For example the terms of sale will have an effect on demand and hence the ultimate amount of receivables that a firm may want or be able to carry. If the length of the credit period is extended, demand quite probably will be increased along with an increased amount of receivables. The manager must then face the decision as to whether increased accounts receivable will be too costly to permit effectively meeting the other organizational objectives. Money tied up in receivables is obviously lost to profit making investments elsewhere. Compound this with precautionary balances maintained in the event of bad debts and collection delays and receivables can turn into a costly venture.

The opportunity cost of the precautionary balance may prove to negate investment opportunities that would have provided a net profit.

To start formulating an optimum credit period length such that the most efficient levels of receivables are maintained, one would look at such variables as sales, expected levels of accounts receivables, and profits expected from sales.²² In his article, Wrightsman assumed that the firm is a profit maximizer and that the credit length period is similar to its competitors. Also, it was assumed that sales and collections were uniformly continuous over time and that customers on the average paid off their debt no sooner or later than required. From this he formed an optimal credit length based on a positive sales function, a positive expected accounts receivable function and an expected profits function. He formed a composite curve of all three functions and found that optimum point of profits at the apex of the curve so formed. Theoretically the firm should operate at this point, thereby having the best credit period and level of receivables.²³

Still another dimension may be added to determination

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²³Similar articles written on optimum credit policy formulate an objective function that must be maximized. These objective functions are composed of such variables as the number of good loans granted, the number of bad loans granted, the net present value of bad loans, the number of
of credit policy. Opportunity cost was mentioned on the part of the lending institution, but what of the buyer? He too has an opportunity cost associated with borrowing or working on credit. He may have good use for funds made available to him by using credit rather than cash and this use can be translated into a price reduction for him. Hence the effective price paid in the long run would be beneficial to the borrower. If potential buyers have a higher opportunity rate, that is the benefits of using cash to a good purpose during the credit period, then the effective price to the borrower would be less. The reverse of this would also be true (lower opportunity rate corresponding to a higher effective price). Therefore, the wise manager will attempt to base his credit decision on the opportunity rate of the buying (made increasingly difficult as it is different for each individual) coupled with discounts to aid in increasing the opportunity rate.

The optimal credit policy therefore is a diverse collection of various parameters that require a delicate balance. The credit manager should be acutely aware of consumer-oriented marketing practices in determining how a policy applications received and so on. The articles stress the importance of analyzing all variables simultaneously, which is tacitly implied in the above discussion. See for example Robert O. Edmister and Gary C. Schlarbaum, "Credit Policy in Lending Institutions," Journal of Financial and Quantitative Analysis, (June 1974), pp. 335-339.

will be ultimately formulated as well as attempting to juggle discounts, collection periods and credit periods. Risk is a big factor here as most companies do not follow exactly the credit policies of their competitors as was assumed earlier in the determination of the credit period. Of course it should also be mentioned that external effects of the market, economy, competition, entry to the industry, national money policy and so on will have a marked effect on the credit policy of the firm. Naturally, none of these external factors is easily predicted, thus lending additional difficulty and uncertainty for the overall forecasting problem.

To aid in establishing some procedure to the determination of indecision and uncertainty, several methods have been established which attempt to assign probabilities to various outcomes. Sequential analysis is such a method that has been receiving much attention lately. Dileep Mehta has written a thorough work on sequential analysis whereby decision trees are used to determine whether to grant, reject or postpone a credit request. Much of the process is based on past experience of a firm in granting credit and upon the cost of obtaining relevant data to effectively analyze new applicants. Mehta concludes that once a system has been established to aid in adjusting for uncertainty, constant up-


date of the frequency distributions, probabilities associated with each decision, and the like must be accomplished by management. That processes remain constant is very often a dangerous assumption. He also mentions that variables such as length of credit period, collections policies and bad debt levels to name a few will affect the credit policy. This reinforces the previous discussion of components of an optimal credit policy.

In summary then, one might relegate the formulation of a credit policy to marketing practices, a juggling act and a magic show. Managers must incorporate consumer orientation and must obey the "four P's" just as a new product on the market must. Similarly the credit manager must be able to cope with and discern the layers of his "product's" marketing environment to incorporate company policy and objectives, the number and types of applicants and the ramifications of the economy on the policies he must enforce. Yet the manager must initially attempt to look at the overall picture and simultaneously assess all factors acting upon it, attempt to determine what forces will act next and consolidate an answer. A difficult task.

General Policy and Risk Evaluation

Thus far this paper has been concerned with a brief.

general theory of accounts receivable and credit management. The next section will turn to the more specific purposes of the study as risk evaluation and credit scoring methods are discussed.

How banks, loan agencies, retail stores and other firms that extend credit decide to do so is really one of the main questions to be answered. Essentially what must be accomplished is to evaluate the amount of risk to be assumed by the lending institution. Depending upon which finance text one is familiar with, this is done by looking at the 3, 4 or 5 C's. The 5 C's which shall be described here and shall be used as a model in Chapter III are incorporated by Weston and Brigham as Character, Capacity, Collateral, Capital and Conditions. Character defines the probability that an individual who borrows or is extended credit will repay his debt and try to honor all obligations. A credit manager interviewed in the study described this aspect as one of the most important of all in judging whether or not to extend credit. Capacity is subjective and describes the ability of an individual based on past records, style of living, business methods and so on. The borrower's financial position

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28 Weston and Brigham's Managerial Finance is used in this case. It stipulates 5 C's all of which are incorporated in the 3 C's of Van Horne's Financial Management and Policy or the 4 C's used by Hunt et al. Basic Business Finance.

29 Weston and Brigham, op. cit., pp. 536-537.
and capabilities are measured by the third "C", Capital. Tangible net worth is a large factor with a bigger firm. Collateral represents the assets that a consumer may offer as security should default become apparent. Finally, Conditions describe the general economic effects upon the consumer and any significant occurrences in the nature of the economy that might influence the consumer's ability to meet his obligations.

These 5 C's represent the general methods by which each applicant is judged in determining the worthiness of extending credit. Generally they are incorporated in some form or other on application forms for loans or credit cards.

Although the concept of the 5 C's appears to be theoretical, they are in fact used in actual loan transactions. John A. Anderlick, in an article entitled "How Bankers Make Their Credit Decisions" (Credit and Financial Analysis, August 1974) stipulated that the large banks use the C's of credit in determining the amount of risk involved in granting credit.30 He states that one of the most important functions of a bank is to be fully cognizant of current economic developments and their impact on money markets, interest rates, regulations imposed upon banking and general banking practices. A credit manager must certainly be aware of what underlying causes contributed to the current state of the

30 Mr. Anderlik used only 4 C's in his article mentioned above. The number of C's appears to be dependent on preference as the ideas behind them are the same.
economy. Hence he must acknowledge and be tolerant of conditions.

Mr. Anderlik continued by stating the financial statements are also extremely important in determining credit worthiness. A credit manager must not only view financial statements and outside opinions as a means to an end, but should conduct and form his own research and opinion independently in an effort to achieve a consolidated financial package of the applicant in question. Nothing should be left unturned as the case of Penn Central will point out. In short, the Capital structure must be carefully scrutinized.

Most emphasis of the article appeared to be geared towards conditions and capital. Mr. Anderlik acknowledged, however, that collateral and character were important in deciding whether the firm or consumer was noteworthy or should be investigated further. In dealing with larger firms, character would most probably take on the form of management and management practices, decision making procedures and so on.

Finally, a point worth mentioning about the article is one noted earlier concerning consumer oriented marketing. Inherent in making decisions, especially where large corporations or great quantities of applications are involved, a thorough and swift management information system is required to insure that those who make the strategic and operational plans of any industry are informed of all relevant data. All levels of management must know what objectives they are
aiming for and insure that there are procedures for accomplishing these objectives. Hence information must flow vertically and horizontally with great efficiency. Yet, management must realize why these plans exist, who it is in business to serve, and what the complex management information processes are all about. In Mr. Anderlik's words: "Underlying all of this, of course, should be the concern for the 'customer's viewpoint.' This is the primary consideration behind the continuing and innovative expansion of banking services."\textsuperscript{31}

**General Credit Scoring Procedures**

The general methodology of credit scoring will be discussed having determined what general requirements are necessary for an optimal policy and knowing some of the principles used for evaluating the riskiness of granting credit.

Essentially credit scoring is a means of quantifying decision making processes. Characteristics of loan applicants such as age, length of time on the job, credit references and so forth are given specific weights (or scores) based upon the firm's past experience with good and bad applicants. A good applicant is defined as one who honors his obligations whereas a bad applicant is one who defaults.

In most of the materials reviewed concerning credit

scoring or numerical evaluation models, multivariate and discriminant analysis were used on a large sample of proven applicants, that is, proven to be either good or bad. Based upon the statistical analysis, weights were assigned to the various customer characteristics that were found to be present on the loan application. As a control, a second large sample was taken from the same company and the numerical scores were applied to the various attributes found on the applications. Percentages of difference were computed and compared to the actual records to determine whether the numerical model accurately described the firm's policy.

James H. Meyers and Edward W. Forgy accomplished research in numerical scoring systems in the early 60's with the Universal Finance Company in Los Angeles. In an article entitled "The Development of Numerical Credit Evaluation Systems," they stated that some degree of improvement may be realized by use of a properly constructed numerical rating system as opposed to a purely judgmental approach and cited works as early as 1941 claiming the same result. Their method of research was discriminant analysis applied to two different samples as described briefly above. Meyers and Forgy concluded that statistical methods can provide a means for discrimination at any score level assigned to any variables based upon requirements of the firm. Hence, the groundwork for credit scoring has been established and culminated in their work.
Since the early research of Meyers and Forgy, numerous articles and research on credit scoring have been written. Some are skeptical of the credit scoring process, while others vigorously promote it. The ensuing discussion will further pinpoint the pros and cons of credit scoring and the general methodology thereof.

Credit buying has become increasingly attractive to American Society. The increase in commercial as well as consumer credit during the last 20 years has exceeded 7 percent on annual average. Lenders, on the other hand, fearing bad debt losses, have a more cautious attitude towards lending than the consumers have towards borrowing, notwithstanding the fact that lending firms are seeking profit and they may forego some amount of profit by withholding credit to a specific applicant. In the past and also currently, credit managers and loan officers use their own intuition, judgment and experience in deciding whether or not to extend credit based upon personal interview, credit bureau reports and application information. A large element of subjective decision making is inherent in this type of system.

Credit scoring on the other hand is a quantification system by which weights are assigned to specific characteristics of an applicant, as mentioned above. Depending upon management policy encouraging "tight" or "loose" credit policies, a cutoff score can be assigned to define management's desires. That is, when all the weights of the various attri-
butes are added together, they must total a figure that is in excess of the cutoff score in order for the applicant to be granted credit. If the total is below the cutoff, the applicant is rejected.32

The Credit Screen

The general credit scoring procedure (or credit screen as it is sometimes called) is illustrated by Figure I on page 25.

In his article on credit screening,33 William Pogges described a two part system that would facilitate credit extension and overall credit policy. The first part of the system is the credit screen broadly diagramed in Figure I. The second part is the extremely important management information system.

To form the first part of the system, a three phase approach has been suggested by John W. Buckley34 which incorporated a marketing, accounting, and statistical model. Differentiation of credit risks is done with the marketing model in a quantified manner similar to the basic credit scoring

32 Obviously there are criteria for which boundaries would be assigned around the cutoff score such that additional investigation would be required if a score existed within the boundaries.


Figure 1

Block Diagram of Credit Screen

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35Pogges, op. cit., p. 112.
technique described earlier. As a direct measurement of risk may be difficult to obtain, surrogates are used instead. A surrogate is defined simply as a customer characteristic such as age, job, dependents and so on. Once a quantitative value has been assigned, the applicant is placed into a risk group. This group defines a particular risk level that the firm may wish to reject or accept depending on current policy. A risk factor composed of credit department costs, the cost of capital, and costs of carrying receivables is used to further analyze the risk group. This risk factor expresses the ratio of incremental costs to sales (legal fees, bad debt losses, reminders, phone calls etc).

The second phase is the statistical model which attempts to categorize the attributes of the population of applicants in general, and then segment the population into particular risk groups.

Finally, the third phase is an accounting model. This model performs a cost-volume-profit-analysis and selects the project supporting the highest contribution margin. In performing these computations the risk factors (which are variable costs) must be added to other variable costs such as sales commissions to obtain a total variable cost estimate such that a complete break-even analysis might be performed. This can be used with sales to determine the final contribution margin of the product. Imperative in the accounting portion of the model is close scrutiny of the structure of
the firm since different methods may be required for firms with high variable costs versus those with high fixed costs.

Obviously not all phases of the credit screen will be applicable to every case. The accounting phase would be better suited to commercial rather than consumer loans, for example.

The second part of the system suggested by Poggess is that of an adequate management information system. He suggests in his article that vast amounts of data are needed describing good accounts, bad accounts, customer characteristics, state of the economy and business cycles to name a few. Many lenders have problems with deciding what information is important for evaluation of an applicant. It would appear that the more information that is available, the easier it would be to achieve a more rational decision. But although lenders today use computers extensively, thus conquering the enormous amounts of data available, they may lack certain specific information that is imperative in making a credit extension decision. Information that a lender should know are (1) profits received if a customer pays, (2) loss incurred if a customer does not pay, (3) cost of each piece of information obtained and (4) the probability that a customer repays his obligations given certain information. Carl Greer has said that many companies have not


37Ibid.
determined any or most of the above four parameters. He emphasized that a lender must have an idea of the expected value of accepting an applicant in order to avoid purchase of redundant information, purchase of information that does not aid in discriminating between good/bad risks or the failure to purchase information that does discriminate. Greer also suggested that a sequential decision process should be used to aid in determining not only whether a lender should accept or reject the applicant but also the value of the information. By using samples of applicants and conditional probabilities, percentages may be obtained to estimate expected values of extending credit to a consumer. A typical process may be as shown in Figure II.

![Decision Tree Process for the Requirement of More Information](image)

Thus with a credit screening system at one's disposal,

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38 _Ibid._, pp. 44-54.
39 _Ibid._, p. 53.
a credit manager or loan officer has the capability of quantitatively evaluating an applicant and determining the worth of the information available to assess him, hopefully removing subjection from the decision.

**Pros and Cons**

There are innumerable advantages and disadvantages to any system and the credit scoring process is no exception. The advocates of credit scoring claim that it encourages a non-prejudiced decision on the part of the lender thus ensuring against discriminatory credit practices and supporting the truth in lending laws. Mr. H. J. H. Roy of Fair, Isaac and Company, Incorporated has written numerous articles concerning the benefits of credit scoring. In an article entitled "Why Credit Scoring?" Mr. Roy reinforced previous findings by stating that a credit officer must collect all possible information on an applicant. Included in this information would be payment records, application forms, personal interview and credit bureau reports. Information concerning past applicants is also mandatory since a scoring system is based upon past experience. Also, and equally important as past data, is an extensive knowledge of alternative uses of money which include an understanding of regional economic conditions, company objectives, market penetration and so on. This will theoretically enable policy

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changes to keep pace with competition, economic changes and
general business conditions.

Quantification of historical data followed by applying
it to new information allows management to theoretically de-
termine what risk it wants to assume when granting credit by
raising or lowering the cutoff scores. This can allow man-
agement to maintain an equally uniform policy since nebulous
terms such as "tighten" or "loosen" credit could be elimi-
ated by use of quantified scores. And to quote Mr. Roy,
"absence of a quantitative approach makes it impossible for
people involved in the credit granting function to communi-
cate effectively with one another." This statement will
be discussed again in Chapter VI.

Credit scoring has already allowed management to rea-
lize greater profits. For example a 25 percent reduction in
bad debt losses has been noted with no appreciable change in
volume in some firms. Meyers and Forgy have found compar-
able results in their works. Since the profits depend up-
on current company policy and strategy, one cannot afford to
turn away good accounts nor accept bad ones. By applying a
score to those requesting credit one can determine whether

\[4^1\] H. J. H. Roy, "Why Credit Scoring," Articles on Credit

\[4^2\] H. J. H. Roy, "Breakthroughs in Credit Scoring,

\[4^3\] James H. Meyers and Edward W. Forgy, "Development of
Numerical Credit Evaluation Systems," Journal of the Ameri-
can Statistical Association, Vol. 58, (September 1963),
p. 800.
more information would be required (e.g., the score lies within a close range of the cutoff). Thus, credit bureau reports may prove valuable where the score is close to the cutoff. However, reports may not be required when a score is outside this range. If a firm simply blanketed every application with a credit report, costly cuts in profit could occur. With implementation of such a scoring system, some firms have been able to reduce investigation expenses by as much as 33 percent as well as reduce the number of personnel required to perform the credit approval function.44

Roy claimed that with a credit scoring system, management could staff credit granting functions with fewer experienced personnel45 thereby leaving the more experienced people to handle the tougher problems requiring more experience. This would allow time to be spent more efficiently by all concerned. Also, training for positions in credit extension would be minimal as one only has to compare the score of an applicant with a cutoff score to determine whether or not credit should be given. Of course where scores are within a predetermined range of the cutoff score, the more experienced loan officers would be required to aid in the decision.

Improved management practices may possibly be attributed to credit scoring. Not only does the process aid in upward


45 Roy, "Breakthroughs in Credit Scoring," op. cit., p. 29.
and downward communications, but also allows management to
monitor performance and take corrective actions when appro-
priate. Thus it provides for rapid feedback. 46

As was mentioned previously, credit scoring can provide
for non-discriminatory credit extension practices. This
leads to increased good will on the part of the consumer,
when the prevalent feeling is that all will get the same
treatment.

Finally, a credit scoring system encompasses the cumula-
tive experience of the entire organization since it is based
upon two or three years accept-reject records which in turn
are based upon the experience of veteran loan officers and
company policy. 47 This allows for shorter on-the-job train-
ing sessions and allows a junior loan officer to see the
overall picture of the firm's objectives rather than just a
narrow view of one person's experience and opinions.

Critics of the system appear to be numerous, although
there has not been much written about the disadvantages or
defects in credit scoring. One such article, "Potentials of
Credit Scoring: Myth or Fact" by Thomas R. Harter, has at-
tacked the cost of implementation as one aspect that would
inhibit credit scoring. Additionally, firms that attempt
shortcuts in installation may negate the benefits that would
be gained. Also, computer systems are expensive, and with

47 Ibid., p. 38.
the vast amount of data which must be considered simultaneously, a computer is a necessity. Harter argued that few firms have the vast amount of data required for an extensive scoring system which substantiates Greer's comments. As a result, the firm may take shortcuts again, thereby seriously limiting the system.

Another inherent fault in the formulation of the system according to Harter is that borrowers who were rejected are not included in the formulation of scores. Therefore, although the system represents the company policy, it also represents its biases which are built into the scoring.

Harter continued by attacking the proposed benefits of credit scoring. First he claimed that the specific evaluation methods do not aid in training new loan officers because it is based on decisions of old officers and therefore is as narrow as having one or two veterans teach a new recruit. Secondly, a firm cannot afford to use less experienced personnel because the scoring system is based on old policies, and since old policies required much experience, the new system would require similar experience to at least pre-screen the application. Third, Harter stated that the costs of screening would not be lowered because the old policies built into the system invalidate it.

Harter concluded his article predicting a rather bleak future for credit scoring in actual practice. He sees its use solely for academic purposes to teach students about the
credit granting process. Meyers and Forgy also concluded that numerical rating systems were not particularly popular, and they included in their reasoning that loan officers were reluctant to abandon their usage of experience for untested quantified methods as well as the difficulties of implementation.

On a more theoretical level Chatterzee and Barcun implied that the statistical technique of discriminant analysis is not the best way to determine a score for various characteristics. They suggested that discriminant analysis is valid when applied to data from two multivariate normal populations. But many variables used for credit screening are qualitative and have distributions which differ markedly from normal. Hence, statistical inaccuracies will be inherent in the system.

Examples of Credit Scoring Usage

Credit scoring has been used not only in retail department stores and loan agencies, but also in the areas of mortgages and commercial loans. G. K. Rakes wrote in "A Numerical Credit Evaluation Model for Residential Mortgages" that late payments by borrowers are believed to be related to definable and measurable characteristics. These characteristics are similar to those mentioned for consumer loans such

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as age, occupation and so on. Rakes' model required huge amounts of data and an ever changing set of equations to incorporate fluctuating economic condition, business cycles and regional characteristics. Rakes mentioned that although such a model may be feasible, extension of loans is made for the most part upon experience and good credit analysis.

Commercial loans may also be extended by means of a credit scoring system although caution must be used because of differences between the consumer and commercial loan. Variations in population characteristics, size, terms, collateral and standardization cause a commercial model to be quite different. 49 Factors or characteristics that one would look at for commercial loans would be age of the business, years of present management, successive years of increased profit, and quick ratio to name a few. 50 As with mortgages and consumer loans, credit scoring for commercial loans does not appear to have widespread acceptance nor usage, although models do exist. Apparently Harter's relegation of credit scoring to the academic world has proven true to some extent.

It is interesting to note that although the specifics of credit scoring for consumer and commercial loans are


worlds apart, the general procedures, problems and advantages are very similar if not the same. Just as the loan officer or credit manager may have the final say for a consumer loan, the fate of a commercial loan rests upon the decision of the bank examiner. 51 If he does not criticize the application, it is accepted as a good account. If he criticizes it, it is rejected as a bad loan. Hence the bank examiner's opinion carries considerable weight. Additionally strong emphasis is placed upon classifying a loan correctly as either a good or a bad loan because of the high penalty costs associated with an incorrect classification.

Concluding Remarks

"To move yesterday's foot into today means abandoning some of yesterday's practices." 52 This is perhaps one of the most difficult obstacles to overcome when doing anything new. Many lenders simply refuse to relinquish the success they have achieved by using their earned experience. Yet making a loan is simply another form of making a bet. The lender is betting that his judgment is capable of determining whether a borrower will honor his obligations or not. Hence, the lender needs reliable, accurate data and a system that will allow a quantifiable decision to be made on other-


wise qualitative data.

Mr. Roy has suggested that qualitative data can and do lead to incorrect decisions. Higher bad debts occur because of a failure to realize volume potential. Higher than necessary credit investigation costs, and higher than necessary collection costs may be alleviated by insuring that the lender has a better grasp of the odds that his bet will be successful.

Poggess stated in his article mentioned above that a credit control or scoring system will aid management in determining the policy that will reap the highest profit given current economic conditions. Hence the level of business accepted may be varied precisely as business conditions change.

Yet using the credit score as a management tool requires strong management support. Not only must all of the individuals concerned be informed of the system, they must also be encouraged and aided every step of the way from implementation to final operation and beyond. Operating management must use the system and support it by determining the risk acceptable such that the field personnel are not left with a decision that they might be incapable of making. If management did not support the system, then the way would be paved for more subjective and qualitative decisions thus se-


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verely limiting the system altogether.

However, installing a credit scoring system may cause difficulty. First of all, people may be averse to changing their ways to even try a new system. Secondly installation costs may prove to be prohibitive. Finally, there must exist a strong, viable communications system. $^{54}$ "Motivating people to produce better results is largely a matter of making adequate explanations." $^{55}$ Hence the burden of the success of the system rests upon management.

Training junior personnel swiftly has been mentioned as an advantage to the credit scoring system. An individual can make a decision and then check it with a credit score. Thus the score serves as a tool and not just a final decision. This will theoretically enable an individual to ascertain the overall credit picture of a firm.

It cannot be over-emphasized that the information obtained is extremely valuable to the system itself. One must exercise extreme care in obtaining the information to make a decision because the information obtained may be either redundant or not conducive to statistical evaluation. $^{56}$ In either case, procurement of the information will be costly

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and deplete the profits accrued.

As a final note it might be worthwhile to note that many loans that have been made were not analyzed closely enough as discussed in Chapter I. Yair E. Orgler stated in his article that loan review requires much attention, but may get very little. Additionally, loan losses tend to be related to lack of attention as well as inadequate credit standards. This is supported by H. J. H. Roy in his article "Human Judgment Versus Credit Scoring:"

When comparisons have been made for each characteristic, it becomes clear that in the current practice of accepting or rejecting applicants, loan officers are attaching predictive significance to information regarding applicants quite different from the significance warranted by subsequent good/bad experience. The cumulative effect of several such comparisons, typically, is convincing evidence that the loan officers have not been evaluating applicants as well as they might and that a scoring table which builds in subsequent experience is a useful predictive tool.

Thus it would appear that experience combined with a dynamic credit scoring model would best produce a viable credit evaluation system. Included in this is of course a workable management information system.

Returning to the credit area problem, the methodology and analysis procedure will be discussed in Chapter III, whereby methods for gathering information and pertinent statistical analysis will be outlined.

57 Orgler, op. cit., p. 435.
CHAPTER III
METHODOLOGY

Determination of the Credit Area

Recall from Chapter I that a credit area is defined by a standardized credit policy in that area. The aforementioned problem of this study is to determine whether such a standardized policy exists in the Great Falls area, (thus confirming the hypothesis) and to determine if this is a best or optimum policy. In this chapter the methodology involved in data collection and analysis in attempt to achieve the stipulated goals in Chapter I will be discussed.

Data Collection

Data were collected in two ways: (1) personal interview and (2) questionnaire. The questions asked of the interviewees and a copy of the questionnaire that was distributed appear in Appendices I and II respectively. The firms that participated in the project are listed in Appendix III.

The business type and size are not considered important for the ultimate results. The basic requirement was that the firm obviously extend credit in some fashion. The firms that were interviewed formed four basic categories which included banks, credit unions, retail stores and loan agencies. Finally, consumer loans were the main types and these receiv-
ed the greatest concentration although commercial and real estate loans were encountered. It can be assumed then that the ensuing results will be primarily concerned with a consumer loan.

In conducting the interview, the same format was used in all cases beginning with an introduction and explanation of the purposes of the project, the interview questions, and presentation of the questionnaire. So as not to consume a great amount of an interviewee's time, a maximum of approximately thirty minutes was allotted for each. It was felt that an interview encompassing a small amount of time would lend itself to achieving more accurate results.

The interview was intended to determine general facts concerning an institution's operations and policies. By presenting each loan officer with a general set of questions, an intuitive picture of the area as well as overall management practices would hopefully present themselves.

Basically the questions asked in each interview were directed towards four broad areas to include management practices and organization, credit policies, human relations, and credit size. With respect to management and organization, each loan officer was asked to evaluate current management practices and effects. These questions and their related discussions were intended to aid in achieving the "intangible" goals mentioned in Chapter I. The credit policy category is self-explanatory in that the questions concern
themselves with the manner in which each firm would extend credit to a customer. Human relations has a bearing upon an institution's consumerism and general marketing outlook.

Finally, credit size attempts to aid in comparing each firm in order to determine a rough estimate of the amount of credit extended in the area. One might quite reasonably expect a good degree of interrelationship among these four areas.

The Control Model

Essentially the quantitative (questionnaire results) portion of the project was intended to serve as a comparator against which the qualitative (interview results) portion might be measured. Thus the control would be the weighted opinions of the various credit managers and loan officers. Their experience in effect would be pooled and applied to a naive credit scoring system. This in turn was applied to a specific individual and was used to compare against the general findings obtained from the interviews.

In order to obtain an "experience pool," a model was formed based upon the 5C's of credit. The result was a short questionnaire as shown in Appendix II. Although the grouping is subjective, Figure III depicts the classification of the characteristics in each category. There is some overlap in the various categories but this is to be expected. For example, conditions may very well apply to every characteristic. And, depending upon the type of loan in question, different characteristics may be added to the var-
<table>
<thead>
<tr>
<th>Character ((C_1))</th>
<th>Capacity ((C_2))</th>
<th>Collateral ((C_3))</th>
<th>Capital ((C_4))</th>
<th>Conditions ((C_5))</th>
</tr>
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<tbody>
<tr>
<td>Age</td>
<td>Number of Children</td>
<td>Home Owner</td>
<td>Income</td>
<td>Occupation</td>
</tr>
<tr>
<td>Bank References</td>
<td>Income Bracket</td>
<td>Car Owner</td>
<td>Savings</td>
<td>Time at Address</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Bank References</td>
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<td>Income</td>
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<td>Occupation</td>
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<td>Geographic Location of Residence</td>
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</tbody>
</table>

**Figure III**

Groupings of Customer Characteristics
ious categorical headings as well.

As a final thought concerning the interrelationships of the characteristics, one might consider forming a hypothetical analytic model (not to be confused with the control model mentioned above) as follows:

$$ C_E = \sum_{i=1}^{n} X_1 * \sum_{j=1}^{5} C_j $$

where $C_E =$ Credit to be extended

$X_1 =$ weight coefficients applicable to particular firm's policy (1 = 1, 2, 3, ... n)

$C_j =$ the 5C's of credit categories (j = 1, 2, ... 5)

Such a model would incorporate not only each of the categories pertinent to risk and credit evaluation, but also any combination of them. This approach, however, exceeds the limitations of this paper, but might be considered for future work.

In order to apply the control model to a specific case it is necessary to establish a weight for each characteristic in general (this will be the pooled opinions of the individuals interviewed) and to establish a specific characteristic coefficient. This will be determined by a composite of some of the institutions in Great Falls that use credit scoring as a policy or guide in their credit evaluation process. These specific characteristics are in fact the naive credit score mentioned previously. To use the model, the
weight was multiplied by the coefficient for each customer characteristic. These scores were summed for a final score. The actual method is demonstrated in the next chapter.

Data Analysis

The qualitative data as determined by the interview were compiled and consolidated by the questions asked in the interview. Material that was obtained from the various firms was discussed as it pertained to a given question subject. This material included loan applications and information from loan officers' personal files.

Quantitatively, the results were shown in tabular form along with their specific statistical measures. Essentially each score for each characteristic was totalled and a mean calculated. This yielded the characteristic weight. This weight was coupled with the specific characteristic coefficients as mentioned above, to determine final scores.

The results of the project were discussed in light of their relevance to the credit area and optimum policy. Conclusions and recommendations were presented along with the overall success of the findings and satisfaction of the initial goals. The data results are the subject of the next chapter.
CHAPTER IV
ANALYSIS

Data Collection

The results of the data collection, as determined from the interviews and questionnaires, are discussed in this chapter. In general, the chapter is divided into three areas: (1) qualitative results, (2) quantitative results, and (3) application of the model to a specific case. The qualitative results are patterned after the questions in the interview with the results grouped together as averages when possible. Quantitatively, the final results of the pooled opinions are stated as the weights for each particular characteristic along with an analysis of these characteristics found on the various application forms. Finally the credit scoring system (specific characteristic coefficients) is explained and applied to a particular credit applicant.

Qualitative Results

In discussing the qualitative results, the four categories of credit size, credit policy, management, and human relations are used to organize the findings as mentioned in Chapter III.

59 The material contained herein is based upon interview and questionnaire results with the 27 firms listed in
Credit Size

As to the credit size of the various institutions, 67 percent of those interviewed had established branches of affiliates elsewhere in either the state or the country, demonstrating diversified, decentralized organizational framework of the majority of the credit firms in the Great Falls area. In 59 percent of the firms that were able to estimate the amount of credit extended, the range was from $8 thousand to $65 million on an average monthly basis. With such a wide range (the high end tended to swing the mean extremely high as might be expected), a median of $108 thousand was found to be a typical amount of credit extended by a given firm. A similar range was found to exist for the amount of receivables owed to any given firm in a month. The range in this case extended from $10 thousand to $60 million. However with receivables, the multimillion dollar category was more heavily weighted. The figures given accounted for 70 percent of all of the firms questioned with a median receivables value of approximately $600 thousand for a given firm. Again, these figures were for a monthly basis.

Of those firms that did not give an answer for either of the two questions concerning either credit extension or receivables, the main reasons were that the credit managers either had no idea since receivables and loans varied extremely from month to month, or the credit records were at

Appendix III. Data Analysis and calculations for the "typical" firm are contained in Appendix V.
some other central location and the local firm did not handle these particular statistics. In only two cases did the managers refuse to comment upon these figures.

A final factor of credit size was the amount of applications received and of those the amount rejected. Applicants ranged from four to one thousand monthly with a rejection range of 3.3 percent to 80 percent which shows a considerable variation that was attributable to the type of firm, type of loan required, clientele characteristics and so on. Only 67 percent of those firms interviewed could determine roughly how many applicants applied. Some of the firms had no idea of either how many applicants they received or the rejection rate. Approximately three firms professed no knowledge of either of the statistics.

Thus, the size of a typical firm which extends credit in the Great Falls area is one which extends roughly $108 thousand per month in credit, has an accounts receivable inventory of $600 thousand per month, receives about 70 applications per month and maintains roughly a 29 percent rejection rate.

Credit Policy

Credit policy refers to the manner in which a firm extends credit. The first determination made was whether an organization applied or used a credit scoring technique in its credit granting process. Of the firms asked, 70 percent did not use credit scoring. The preference was the experience of the loan officer or credit manager coupled with their own
intuitive feelings about the applicant. Of those who stated experience as their methods for granting credit, several variables were cited as "tools of the trade:" characteristics of the applicant stated on the loan application, character of the applicant (repayability), the "C's" of credit, knowledge of the classes of people in general, purpose of the loan, and personal contact.

Current policy and experience were the prime factors for either method of credit granting. In a few cases the credit managers or loan officers could give no valid reasons for using that particular method other than tradition. The human element was important in the experience means of credit extension and numerous individuals stated that a credit scoring technique would eliminate this valuable attribute.

The credit scoring faction on the other hand supported its policy's existence by insisting that it was more advantageous in standardization, control, applicant qualification, and allowing more inexperienced personnel to grant or reject credit.

With respect to investigation, all but one of the firms questioned made use of credit bureau reports. The one exception very rarely used any form of investigation due to the clientele associated with it and the extremely low delinquency or default rate. This one particular agency claimed no defaults this year (1975). The credit bureau reports are normally supplemented with the following information: spot
checks (if credit reports are more than a year old), reports from references listed on the application, and employer recommendations and job verification. Some managers also stipulate that observation and direct check of the application by in-house personnel was in many cases all that was required with credit bureau reports utilized only as necessary (these reports were deemed necessary for new accounts).

When queried about the most important information that could be received on an applicant, the managers replied that character and capacity were by far the most relevant. Capital considerations were next in importance followed by collateral. Underlying all of the above four categories was of course the fifth "C's" conditions. Ability to pay was frequently cited as that portion of capacity that was supportive in decision making. The various loan officers stated that the current economy along with an individual's credit record added up to a large portion of ability to pay.

Most individuals questioned found it exceedingly difficult to pinpoint a specific piece of information that would be the most important and rendered a far reaching answer, "ability to pay." Some specifics were stated such as own or rent, length of time on the job, personal contact, cash flow and honesty. All of these various characteristics can be fitted to a specific "C," but in general their frequency of occurrence was small.

The normal payment period encompassed a range of 20 to
120 months and 30 to 90 days dependent upon the type and amount of the loan. Nearly all were paid on a monthly basis with a small exception of one or two which could extend to 45 days. In discussing a specific commercial loan, annual payments are not uncommon. On the average most firms expected that a consumer would make his payment during a specific time during the month plus a variable grace period. If no payment were received in five days, many of the firms would send a reminder in the mail. The time lapse for a late reminder varied, but any time between 5 and 30 days was most common. The longest time a firm would wait was two months.

Most firms maintained an extremely flexible policy of handling accounts in arrears. Their first contact was normally in the form of a late payment reminder followed in many cases by a bit stronger note. A phone call subsequently followed by personal contact eventually occurred. Legal action, collection agencies, foreclosures and so on were used for the most part as an extreme last resort. Most managers preferred to talk to each applicant personally to attempt to determine the cause of the problem or problems. Frequently an applicant received a loan on the first of the month and encountered troubles not foreseen by any evidence on the application, credit records, the credit manager's opinion or the applicant's knowledge. It would be unfair to deny an individual credit on the basis that he may experience some transient problem or problems. Most loan officers made
every effort to determine the conditions surrounding the
unpaid account and attempted to work out the problems with
the individual. In the long run, it made more sense to sal-
vage the amount even though it took more time to obtain pay-
ment, rather than to simply charge it off.

Overall, 56 percent of the individuals interviewed did
not think that the geographic location (i.e. Great Falls) had
any affect upon their policy. The others who did feel that
the location affected credit policy pointed to the type of
industry in the area (primarily agricultural) and the Air
Force Base as prime factors causing their policy to be affec-
ted in some way.

In summary, the credit policy of a typical Great Falls
firm was to grant credit based upon the experience of the
loan officer and the general character and capacity of the
applicant. To back up the intuitive decision, credit bureau
reports, spot checks and job verification were used. Pay-
ment periods were on the average about 36 months long with
payments due monthly. The firm maintained a flexible policy
of working with the customer to solve any problems which oc-
curred within the payment period and did not use legal mea-
sures other than a last resort. Finally, with respect to
the area, the majority of managers and loan officers felt
that it did not affect their credit policies.

Management

Management practices were varied and were dependent
upon the firm as might be expected. The credit managers and
loan officers in 70 percent of the cases did not have much
voice in determining credit policy. The majority of this
70 percent may make suggestions and recommendations to a com-
mittee or board to go before senior management. Of the 30 per-
cent that was allowed to make changes and dictate the policy,
four of the companies were home-owned while the other four
were senior credit managers or vice-presidents in a banking
organization. But even in the latter case, senior management
must approve their choices and decisions.

Management information systems were used in one form or
another in about 56 percent of all firms queried. All but
one thought that the employees viewed the computer as a neces-
sity rather than a threat. The small firms that have only a
Great Falls establishment in most cases did not need a com-
puter to file their data. The key to whether or not a com-
puter was needed appeared to have been volume. It was
interesting to note that in the firms that used a management
information system in the form of a computer, many did not
use it for loan or credit extension per se.

Most firms' credit managers thought that the current
policy was adequate. Yet of the 89 percent who said their
current policy was acceptable, there were some who would make
some changes. The majority of the complaints fell into the
area of legislation, both locally and nationally, which was
felt to favor the consumer's side. Clearly, the laws are
very strict concerning an institution that extends credit. In many cases, it was felt that the government has had too much influence in determining how each firm could grant its credit to a consumer. Race, religion, sex, marital status and age are some typical areas which were found to be very controversial. The credit managers determined that the laws were definitely restricting their operations to the point where it was always possible to find "something" in an applicant's credit history that would disqualify him (or her). It was also found that other lenders were a bit reluctant to release any information concerning an applicant to another lending institution because of the law. This made the job for the second lender more difficult and, needless to say, more expensive.

Marketing was found to be a slight problem in that some managers felt that the general public simply did not understand enough about credit. These individuals placed the blame on the lending institutions themselves for not actively selling credit. Still further, it was felt that training new personnel should be improved to allow each loan officer a better opportunity to aid the lending institution in its marketing efforts on a one-to-one basis.

Other changes were generally in the areas of shorter terms of credit, stricter collection policies and empathetic screening policies. These were mentioned only once in the course of all interviews but are no less important than
those mentioned earlier.

**Human Relations**

The human relations category encompassed the marketing aspects of a firm in the form of good will and effective advertising. Out of 27 firms interviewed, a total of nine or 33 percent thought that credit demand was increasing. The other 67 percent thought the opposite in light of current economic conditions. It was difficult to conclude whether a concentrated marketing effort would have helped credit demand. However an education program as suggested by a credit manager would certainly not have hurt the total effort of any of the firms.

Mostly all of the individuals questioned thought that people could be trusted. In fact 85 percent stated unconditionally to the affirmative. Only 4 percent claimed that they could not be trusted because they exaggerate and the remaining 11 percent stated that over 80 percent of the people could be trusted. Concerning cooperation, 77 percent stated that people are definitely cooperative. The remaining 23 percent believed that the majority of the people are cooperative with a few exceptions. It would appear that most of the organizations in Great Falls were concerned with giving the customer at least the benefit of the doubt which of course would promote an aura of good will.
Summary of Interview Results

Table I below provides a summary of qualitative results previously discussed. These data are for a "typical" firm in the area notwithstanding size, business type, population differences, and so on.

**TABLE I**

Summary of Interview Results Yielding a "Typical" Firm in the Great Falls Area

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Size, credit extension (monthly)</td>
<td>$108,000.00</td>
</tr>
<tr>
<td>Size, receivables (monthly)</td>
<td>$600,000.00</td>
</tr>
<tr>
<td>Number of credit applications (monthly)</td>
<td>70</td>
</tr>
<tr>
<td>Percent of credit applications rejected (monthly)</td>
<td>29%</td>
</tr>
<tr>
<td>Method of granting credit</td>
<td>Experience</td>
</tr>
<tr>
<td>Most important information for granting credit</td>
<td>Character and Capacity</td>
</tr>
<tr>
<td>Average payment period</td>
<td>36 months</td>
</tr>
<tr>
<td>Collection period</td>
<td>Monthly</td>
</tr>
<tr>
<td>Loan officer/credit manager change policy, dictate policy</td>
<td>No</td>
</tr>
<tr>
<td>Use management information system</td>
<td>Yes</td>
</tr>
<tr>
<td>Current policy adequate for firm</td>
<td>Yes</td>
</tr>
<tr>
<td>Believe people are trustworthy</td>
<td>Yes</td>
</tr>
<tr>
<td>Believe people to be cooperative</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Quantitative Results

As previously mentioned, the number of firms interviewed was 27. However, only 25 answered the questionnaire shown in Appendix II. The results of the questionnaire listing actual mean, rounded mean, range, the median and the mode are presented in Table II. The rounded mean, determined by rounding the actual mean to the nearest whole number, will be the characteristic weight.

Notice that the most important (heavily weighted) characteristics are occupation, income bracket, and length of time on the job. Occupation and length of time on the job are typically classified under character, and income bracket may be classified under capacity. Thus, it appears as though the qualitative and quantitative results initially agree as to the most important information.

Upon investigation of a variety of loan applications, occupation, income and time on the job were always present. Additionally, number of children, age, time at present address, marital status and distinction between home owner or renter were also found on most applications. Thus capacity and character in the form of indicators of stability are strongly inherent. Table III shown below indicates the characteristics listed on the questionnaire and the frequency of the ratings which they achieved from the various loan officers. The frequency diagrams which follow depict this information for each characteristic graphically.
<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Actual Mean</th>
<th>Rounded Mean (Characteristic Weight)</th>
<th>Median</th>
<th>Mode</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupation</td>
<td>7.48</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>5-9</td>
</tr>
<tr>
<td>Number of Children</td>
<td>3.72</td>
<td>4</td>
<td>3</td>
<td>1,5</td>
<td>1-9</td>
</tr>
<tr>
<td>Sex</td>
<td>1.92</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1-9</td>
</tr>
<tr>
<td>Home Owner</td>
<td>5.16</td>
<td>5</td>
<td>5</td>
<td>5</td>
<td>1-9</td>
</tr>
<tr>
<td>Bank References</td>
<td>5.92</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>1-9</td>
</tr>
<tr>
<td>Age</td>
<td>3.84</td>
<td>4</td>
<td>5</td>
<td>1</td>
<td>1-9</td>
</tr>
<tr>
<td>Income Bracket</td>
<td>7.16</td>
<td>7</td>
<td>7</td>
<td>9</td>
<td>5-9</td>
</tr>
<tr>
<td>Savings/Checking</td>
<td>5.80</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>1-9</td>
</tr>
<tr>
<td>Car Owner</td>
<td>2.96</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1-7</td>
</tr>
<tr>
<td>Length of Time on Job</td>
<td>7.72</td>
<td>8</td>
<td>8</td>
<td>9</td>
<td>5-9</td>
</tr>
<tr>
<td>Geographic Location of Residence</td>
<td>3.25</td>
<td>3</td>
<td>3</td>
<td>1</td>
<td>1-7</td>
</tr>
<tr>
<td>Telephone</td>
<td>4.84</td>
<td>5</td>
<td>5</td>
<td>9</td>
<td>1-9</td>
</tr>
<tr>
<td>Marital Status</td>
<td>4.96</td>
<td>5</td>
<td>5</td>
<td>1,5</td>
<td>1-9</td>
</tr>
<tr>
<td>Length of Time at Address</td>
<td>5.92</td>
<td>6</td>
<td>6</td>
<td>5</td>
<td>1-9</td>
</tr>
</tbody>
</table>
Occupation Income

Figure IVa Figure IVb

Time on Job Number of Children

Figure IVc Figure IVd

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Age

Time at Address

![Age Graph](Figure IVe)

![Time at Address Graph](Figure IVf)

Marital Status

Home Owner

![Marital Status Graph](Figure IVg)

![Home Owner Graph](Figure IVh)

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<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>9</td>
</tr>
<tr>
<td>Occupation</td>
<td>12</td>
</tr>
<tr>
<td>Number of Children</td>
<td>2</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
</tr>
<tr>
<td>Home</td>
<td>4</td>
</tr>
<tr>
<td>Bank Reference</td>
<td>4</td>
</tr>
<tr>
<td>Age</td>
<td>2</td>
</tr>
<tr>
<td>Income</td>
<td>8</td>
</tr>
<tr>
<td>Savings/Checking</td>
<td>3</td>
</tr>
<tr>
<td>Car Owner</td>
<td>0</td>
</tr>
<tr>
<td>Time on Job</td>
<td>9</td>
</tr>
<tr>
<td>Residence Location</td>
<td>0</td>
</tr>
<tr>
<td>Telephone</td>
<td>6</td>
</tr>
<tr>
<td>Marital Status</td>
<td>4</td>
</tr>
<tr>
<td>Time at Address</td>
<td>5</td>
</tr>
</tbody>
</table>
Notice that occupation, income and time on the job are all heavily weighted towards the upper end of the scale as described earlier by their respective ranges in Table II. Figures IVa, IVb and IVc demonstrate this fact as well as the tendency to center around the value of 8 for each characteristic. This is attributed to the relatively high importance that the managers relegate to these characteristics. Figures IVd, e, f, g and h are shown because of their high frequency of occurrence on the various loan forms. Age, Figure IVe, spans the entire range of importance values, but appears to be centered between 3 or 4 signifying less than moderate importance. However, age is a stability factor and tends to give insight concerning the maturity of an applicant. Figure IVf, time at address, also spans the range of importance values yet appeared to be weighted towards the more important end of the scale. This would signify that the credit officials placed considerable emphasis on the transience of an individual as an indicator of his ability to repay. Similarly marital status, another indicator of stability appeared centered around moderate importance and is spread evenly throughout the scale. Own versus rent is another stability factor which was considered moderately important as depicted in Figure IVh. As was mentioned, Figure IVe, f, g and h relate to the stability of an applicant which of course is an inherent aspect of character.

Finally, Figure IVd, number of children, is a sub-cate-
gory of capacity. The various managers asked to complete the questionnaire did not place much emphasis upon this characteristic consciously as Figure IVd demonstrates (center score of about 3 or 4). Yet, it cannot be denied that the number of dependents an applicant has can severely limit his payment potential or ability to pay.

The Credit Scoring System

The credit scores or specific characteristic weights used in this project are quite naive. To perform the required multivariate and discriminant analysis on 25 or more firms would prove to be prohibitive with respect to the limitations of this project. And because of the confidentiality of the various firms' records, the required data for analysis would be seriously lacking. Further, the population differences would cause insurmountable problems. This aspect will be discussed further in the next chapter.

The specific scores as noted in Appendix IV are a composite of various firms throughout Great Falls as well as from research in the literature. 60

The development of the credit scoring guide (Appendix IV) consisted of a process of reviewing actual credit scoring models used in the area, observing credit manager/loan officer responses on the questionnaire (Appendix II), and ap-

plying guidelines from the literature. These inputs were combined in a rather naive fashion to form the model shown in the appendix. However, it should be noted that although the credit scoring guide developed was not the result of a thorough multivariate and discriminant analysis, it does parallel the credit scoring models actually used in the area to a substantial degree. Significant deviations from the model developed for this study and the actual models used occur in the cutoff scores and the respective weights given to each characteristic (i.e. occupation, number of children, residence etc.). The sub-categories of each characteristic (e.g. savings/checking: checking only, savings only, both) followed the actual models closely in weights assigned.

Essentially, the weight given to each characteristic can be easily obtained from Table II using the "rounded mean" column. These weights were the results of the questionnaire distributed to the credit managers. The values assigned to the sub-categories of each characteristic were a combination of the actual credit models and an intuitive estimate based upon the judgment of the credit managers. Each sub-category was assigned a value or a weight dependent upon the value given to the characteristic. For example if a specific characteristic was given a weight value of seven, eight or nine, the sub-category weights would be assigned odd numbers beginning with the number one and continuing with three, five and so on. This reasoning resulted from discussion with the in-
dividual credit managers as to their opinion of the importance of sub-categories. Additionally, when compared to the actual credit models, it was found that the weights assigned to the sub-categories were proportional to the weight or relative importance of the characteristic.

In sum, although not truly scientifically designed, the model developed was considered an acceptable tool for analyzing some of the credit practices in the Great Falls area. Since it was developed mainly from the consensus of the area credit managers, it provides at least a surface indication of the importance of certain customer characteristics in determining credit worthiness.

Application of the Scoring System

It was not possible to obtain proven good or bad accounts because of the confidentiality of these accounts. Therefore a sample application will be accomplished on a particular individual to determine worthiness in obtaining credit in Great Falls. The scoring follows below (to determine weights, use Appendix IV).

Assuming a cutoff to be the average of the maximum and minimum possible score (187.5), credit should be extended by the score shown in Table IV.

The implications of these findings in terms of standardized credit policy, optimum policy, success of the project in terms of its goals, limitations and future project ideas are discussed in Chapters V and VI.
**TABLE IV**

Application of the Model

<table>
<thead>
<tr>
<th>(1) Characteristic</th>
<th>(2) Specific Characteristic (Sub-class)</th>
<th>(3) Characteristic Weight ($W_1$)</th>
<th>(4) Specific Characteristic Weight ($W_2$)</th>
<th>(5) $W_1 \times W_2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupation</td>
<td>Managerial</td>
<td>7</td>
<td>7</td>
<td>49</td>
</tr>
<tr>
<td>Number of Children</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Residence</td>
<td>Rent</td>
<td>5</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td>Bank References</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>Age</td>
<td>20-30</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Telephone</td>
<td>in Home</td>
<td>5</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Marital Status</td>
<td>Married</td>
<td>5</td>
<td>4</td>
<td>20</td>
</tr>
<tr>
<td>Time at Address</td>
<td>3-5</td>
<td>6</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>Income Bracket</td>
<td>10,000-19,999</td>
<td>7</td>
<td>3</td>
<td>21</td>
</tr>
<tr>
<td>Savings/Checking</td>
<td>Both</td>
<td>6</td>
<td>3</td>
<td>18</td>
</tr>
<tr>
<td>Car</td>
<td>Owns</td>
<td>3</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Time on Job</td>
<td>3-5</td>
<td>8</td>
<td>5</td>
<td>40</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>217</strong></td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER V
LIMITATIONS OF FINDINGS, ANALYSIS AND
SUGGESTIONS FOR FUTURE STUDY

Limitations

Several limitations of the study and findings are apparent and must be discussed in analyzing the project overall. Perhaps the most positive outcome of the limitation discussion that follows is the generation of other ideas for future, related studies. These ideas will be discussed below in this chapter.

A limitation that was apparent from the outset was the scope of the project. Rather than concentrating on a particular firm or type of business, an all-encompassing methodology was used intending to gain insights as to how credit was generally extended. Obviously this approach does not lend itself to indepth studies of the particulars of a specific business type or a specific organization. Yet it was felt that a broad, sweeping viewpoint was necessary as a precursor for future projects and was warranted.

Taking the scope limitation one step further, the data for proper analysis of the various firms queried (i.e. past records such as number of applicants, average dollar amount of each order, percentage of good versus bad applicants, etc.) would prove to be prohibitive if not impossible to form-
ulate into a common policy. This leads to another limitation which perhaps is as important as the scope, . . . population differences. When combining all of the various firms, as was essentially done, it was stated that the type of business and its size was unimportant as to determination of a general policy. For the purposes of this study, that is, a broad overview, this is a valid assumption. However, one must realize that by combining the businesses in the area, one also combines population differences. Some firms have limited select clientele while others cater to all "social classes." On a statistical basis, to combine these populations would be to introduce a serious degree of error. Additionally, no known scoring system has previously consolidated all population characteristics adequately, and it is quite possible that no scoring system will ever be found to incorporate all of the various population characteristics in the future.

It was the intent of the study to formulate a credit scoring system (which was accomplished) based on the systems used in the Great Falls area and apply it to random applications both good and bad to serve as a comparison against which the qualitative results might be measured. However, this was not possible due to the confidentiality of these applications. This limited the project in another dimension. Perhaps more advanced notice would have helped alleviate this problem. Yet, by applying the credit score to a speci-
fic case, an idea of usage of the scoring system was gained as to how one might possibly be rated and measured in this particular area. Hence, the fact that the records of a particular firm were not obtained did not severely degrade the project outcome. It was felt however, that these records would be necessary should a more specific (i.e. single firm or single business type) study be conducted.

A particularly interesting quality of the project was the difference noted in obtaining answers to the questions and questionnaire from men and women managers. For the most part the women credit managers and loan officers tended to be extremely defensive and reluctant to divulge any information. Their male counterparts, on the other hand, freely expressed their feelings and disseminated as much information as they knew. Perhaps the ramifications of these facts are more sociological than financial, but it was generally felt that because the female credit officials were so reluctant to talk about their respective firms, the information obtained from them was somewhat questionable and hence a limitation to the study. It should be added that this limitation is not particularly serious based upon the scope of the study, but nonetheless it presented a slight restriction.

The definition of an optimum policy as outlined in Chapter II is difficult if not impossible to apply to a given firm or group of firms. Essentially, an optimum policy would be one which maximized buyer opportunity rates, the
credit period length such that profits exceed costs, sales functions, profit functions, accounts receivable functions and so on. Of course achieving these ends might involve assuming certain conditions or restraints which might not hold true in actual practice (e.g. a firm follows credit policy of competitor, no risk, etc.). Additionally, when discussing "optimum" anything, one introduces a degree of semantical argument. Thus for the purposes of the project let it suffice to say that the optimum policy was not necessarily that defined above, but rather one which suited any particular firm such that it operated efficiently at a level acceptable to senior management. Hence, the exact definition concerning opportunity rate, profit functions and the like limit the scope to a more theoretical level when in fact the firms in question operate somewhat differently than the theory would indicate.

Analysis

In searching for a standardized credit policy, one is attempting to find a policy that is roughly the same throughout the population. Also, this policy should be relatively easy to discern and apply to any given entity of the population. Unified management practices must be evident throughout the population with respect to support and use of all available "tools" with which to produce the most efficient operation of each entity. In short, a standard policy is one which is similar for all entities, easily discernible
for all entities and shown to be governed by complete management practices. All of the above three factors must be present when determining a standard policy.

Generally it was found that the majority of firms were extremely cooperative in conducting the interviews and completing the questionnaires. Of the 27 firms queried, only one was uncooperative. That organization did however make a half-hearted attempt at answering the questions thereby allowing some material to be salvaged. The problem tended to lie in the attitude and age of the credit manager. This problem was known to the senior manager who was in the process of alleviating the difficulties. It may be stated as conjecture that because this particular credit manager was a woman, and in conjunction with the limitations previously discussed, this uncooperative attitude may have been a defensive mechanism at work.

In retrospect, the study proved to be successful in terms of its intended goals and purposes. The goals consisted of determining the policies of the various lending institutions, the existence of a similar pattern among the various firms, a scoring model with which to compare the results, and the existence of an optimum policy. The interview and questionnaire results satisfied the first two goals and were described in Chapter IV. Research in an article by Buckley and the various credit scoring models obtained from the firms in the area allowed accomplishment of the third goal
of formulating a general scoring model. The final goal of determining the existence (or nonexistence) of an optimum policy was also fulfilled by analysis of the interview results and ensuing discussion with the various credit managers.

It is possible that much information obtained from the study could have been researched at a library. However, in so doing, the purposes of the paper, namely discernment of the management practices, would not have been fulfilled. The interviews proved successful in accomplishing these purposes. But the point concerning the different attitudes between men and women credit officials must be mentioned again. It remains a question regarding the human relations aspect of management as to why such a disparity existed. Possible reasons may be that these persons did not know the answers to the questions fully; that they feared they would place their jobs in jeopardy by releasing information that might be classified; that they were uneasy talking to a stranger to the organization; or that they would prefer discussing the subject with one of their own sex. It is also possible that just as there was a difference in attitude between the sexes, there also may be a difference in the lending practices between male and female lenders.

Suggestions for Future Studies

Normally future studies might be mentioned after concluding remarks. However as stated at the beginning of this
chapter, the inherent limitations of the project gave way to ideas for more research, and hence these ideas will be presented here.

Since this study is intended to give a general impression of the overall area, it serves as an introduction to further credit studies. The first idea would be to limit the vast scope of the project by concentrating on a specific type of business (finance company, bank, retail store, credit union, etc) rather than all types. In this respect one would be dealing with a bit more homogeneous population than was encountered with the current project. However one still must be careful when dealing with populations because there are also vast differences in population among retail stores (e.g. clientele), banks and so on.

By extending this theme one step further, one could then investigate one specific firm. It is at this point that more sophisticated statistical analysis (discriminant and multivariate analysis) could be performed. This would be dependent upon obtaining the firm's records and files thereby paving the way to computing an exact credit scoring system for the firm. Comparison of qualitative and quantitative results would probably be best suited for a project of this type.

The one-firm approach to the problem may also benefit the firm itself by accomplishing a simulation of its policy in the manner in which R. G. Rupli presented his article con-
cerning profits and simulation. By pursuing an in depth research of one establishment, studying and analyzing its past credit history, credit records and so forth, the computer could be put to use in analyzing alternative policies to increase profit margins. In selecting a particular firm perhaps one would do well to choose a smaller firm in an attempt to make the population characteristics as homogeneous as possible, even though a credit scoring system relies upon large volume.

Another interesting idea would be to consider a particular firm or group of closely related firms (to insure as much population homogeneity as possible) and attempt to determine the underlying background for a particular policy or group of policies by constructing risk profiles, risk groups and profitability indices. These methods coupled with decision tree analysis might prove to serve as a viable reason for a firm's policy and management process, rather than an answer of "it has always been this way."

Consumer credit is obviously not the only type extended. Hence another future topic would be to explore other forms of credit such as commercial or real estate. The subdivisions of consumer credit may also be practically investigat-

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ed with intent of pinpointing exactly the population characteristics for a particular firm.

Agriculture is a large industry in this particular area. The impact of credit usage by the farming community might prove enlightening especially in determining what characteristics of the members of this community are important in the final determination of loan acceptance or rejection.

Finally, an interesting management problem which was alluded to earlier is the disparity between the male-female attitudes in explaining their firm's credit practices. It would be interesting to research this problem to find out why such a disparity existed. This would undoubtedly call for a certain degree of sociological and psychological background as well as financial knowledge. But it would prove to be informative to discover the reasons behind the reactions because they may have an impact on the companies' credit practices.

Thus the limitations, analysis and suggestions for further study have been discussed. The study has proven to be enlightening, rewarding and successful in terms of its goals and purposes. The final conclusions will be the topic of the final chapter, Chapter VI.
CHAPTER VI
CONCLUSIONS

The Hypothesis

Insofar as proving the initial hypothesis that a standard policy exists in the Great Falls area thereby defining it as a particular credit area, the "typical firm" described in Chapter IV, Table I indicated that most firms generally followed a similar credit path. The qualitative and quantitative results also tended to support each other in this regard. But it is felt that the "typical firm" described in Chapter IV should be treated in a very general manner. By integrating each firm's differences in clientele, the distinct population characteristic differences, different types of businesses, different states of progression as to available credit granting tools, varying management restrictions concerning policy, and varying proportions of flexibility in the overall policy, there is no standard policy.

In looking at a standard policy, recall from Chapter V that one of the criteria was to have a policy that was easily discernable. With as many differences as cited above, satisfying that criterion would be prohibitive to say the least. A second criterion was that there must be evidence of complete management practices. By the fact that tools available to the various firms are not all used violates this
standard. Finally, to have a standard policy, all of the three criteria must be present (the third criterion was a similar policy throughout the area), and in this case two were not.

That a standardized policy did not exist does not invalidate the idea of a credit area as the results of the study indicated some basically standard practices. It is intended to bring to light some of these practices.

Optimum Policy

Perhaps no problem can be solved adequately unless every known tool is used in attempting to arrive at a final solution. Notwithstanding the fact that the managers in the lending institutions were leading and successful individuals, it was felt that in general there were more tools that could have been implemented without considerable cost and their institutions' success in turn would have been greater. Specifically a credit scoring system might have been used in conjunction with the time-honored approach of experience. Some firms do this but they were in the minority. Thus, although the major portion of the lending institutions in the Great Falls area had adequately solved the problem of how to extend credit profitably, their solution was not complete.

Senior management seemed typically reluctant to change an already successful venture. With the opportunity to at least provide a self check on current operations that would
seem to enhance their already successful operation and also pave the way for future innovation, management failure to do so appeared to be a bit too rigid if not obstinate. Management must support change because without management support, the change is doomed to failure. It is for that reason that a credit screening system might never attain widespread use in this area.

An optimum policy in the pure theoretical sense does not exist in the area because of management's failure to use all available means of credit extension and because of management's reluctance to change. It is hard to imagine that the various profit functions, cost functions, opportunity rates and so on could be maximized without imaginative management.

However, given the above discrepancies, it should be mentioned that the firms in question may very well operate at their own definitional optimum or most efficient level since the concept of a best level is a relative one. As long as senior management is satisfied with the results of its operation, then that particular level may be the optimum for that firm. Hence the concept of an ever-changing optimum policy. However, for the purposes of the study, an optimum policy per se, does not exist because of the lack of a standardized policy and primarily because of management restriction.
Other Practices

Generally each firm feels that its policies are adequate for itself and its customers. Additionally each firm is concerned with the generation of good will at least at the informational level. Yet it is believed that the merchants in this area enjoy a captive consumer audience that perhaps is taken for granted. If one does not buy an article in Great Falls, he must either do without or embark on a lengthy trip elsewhere. Although this attitude was not present on the surface, its presence was felt at a subconscious level. Given that some of the various credit officials questioned do not like credit scoring because of loss of the human factor, isn't the captive audience feeling somewhat similar? Extending goodwill may have a bit farther to go in the community.

Management responsibility at the junior and intermediate levels was limited. This may not be an unexpected result to have found. Yet it is believed that here is the very place to use credit scoring techniques to allow the junior level executives to dig in a bit harder and begin to understand the basis for credit extension and the company policy. Perhaps there is no substitute for experience, and with a system built on experience such as credit screening, one who is new may very well gain insight at a more rapid rate.

Marketing support was found to be a bit weak. Those in the business of selling credit seem to do so without regard
to the lack of knowledge on the part of the general public. There has not been enough effort on the part of the lending institutions to fully educate the general public as to the advantages and disadvantages of credit. The media has been frequently used but it is felt that in some cases it has been full of gimmickery to entice borrowers rather than educate them. The fact that these promotion efforts have been lacking was mentioned by several credit managers as discussed in Chapter IV. One manager even felt that more of a social injustice was being committed rather than a purely business mistake.

Mr. Charles T. McGarrough stated in a recent address to a bankers' convention that the law of consuming only as much as that which is produced has been ignored by many who have attempted to live beyond their means thus accounting for our rising inflation. Further he stated that "nevertheless, we do have an obligation to fulfill, first and foremost, the legitimate needs (not the speculative needs) of the community with the money we derive from that community." Perhaps we are all to blame for our current economy but the lending institutions have an important ethical obligation to the people of the area to insure proper education concerning money matters. This has not been promoted as much as it should have been.

The lenders in the Great Falls area were believed to be

generally cognizant of current economic conditions. Most believed that the economy is staging a comeback and have begun measures in preparation for it. Awareness of the economy is, as was stated in Chapter II, a must for efficient credit extension.

Finally, a word must be mentioned about legal ramifications. By law it is inexcusable to discriminate against an individual because of race, sex, religion, age and so on. Sex, for example was rated overall as a 2 on the questionnaire signifying relative unimportance. Yet one loan officer rated it as 9 stating that he was operating within the law. It is difficult to ascertain how one can rate sex as extremely important in granting credit and still remain within the law, while the majority consider it significantly unimportant and also remain within the law. And perhaps the most annoying result found was that one credit manager stated that there was always something that could be found to reject an applicant. Perhaps the dichotomy of the rating of sex is one of honesty versus esoteric operating practices.

**Epilogue**

In summary, the Great Falls credit area may be defined in part by the "typical firm" tabulated in Chapter IV and by the various practices of management as discussed above which include (1) the captive consumer, (2) marketing and promotion, (3) education, (4) the completeness (or incompleteness) of management usage of the tools of credit extension, and
(5) knowledge of economic and legal ramifications.

The general impression of the credit area is that of a solid, close-knit community that has a firm foundation and strong economic base, but also has room for considerable improvement in credit extension practices. The lenders represent their community well and present an impression of competency in their work.

As a final recommendation, it is believed that the community should strive for the most efficient methods of credit extension by using all available tools. This would include the use of a credit scoring system in addition to the experience method, and an ever changing and constant review of its current credit extension practices to insure that the best possible information is received on an applicant. Of course this would include purchasing information only when required. With a competent credit screen, that process could be made much easier. 64

Notwithstanding the tight economy and trauma of a recent recession credit appears to be king. It is believed that credit will continue expansion into a wider variety of new frontiers. And as the horizons for credit expand, so

64 It should be understood that the recommendations are stated for the general Great Falls area. Naturally there are some small, local firms that could not feasibly incorporate credit scoring or computer based management information systems. The recommendations are based on the "typical firm," noted in Table I. Additionally, the recommendations mentioned are to be used only in the realm of the study. They may not necessarily be generalized and applied to other areas.
too will the Great Falls area. Yet this may be delayed somewhat unless considerable thought is given to progressive management and change in order to insure the continuance of a successful, enterprising community.
APPENDIX I

INTERVIEW QUESTIONS

1. Do you have any other branches in the state; country?

2. Do you feel that this particular geographic location affects your overall credit policy?

3. Is the demand for credit increasing?

4. What is a rough estimate of the average dollar amount of credit that your organization extends in a month?

5. What is a rough estimate of the average dollar amount of receivables that you have outstanding at the end of the month?

6. Do you use a credit scoring technique to grant credit?

7. (If credit scoring is not used) How do you grant credit?

8. What prompted your current policy? If credit scoring is not used, would you consider it?

9. Do you employ a management information system?

10. How do the employees react to the computer? Do they see it as a threat?

11. Does the credit manager or loan officer have a say in determining credit policy, or is this policy simply handed down from top management?

12. How much investigation does your organization do prior to extending credit?

13. What is the most important piece of information that you could receive on an applicant?

14. Do you think that people can be trusted?

15. Do you believe that most people are cooperative?

16. Roughly, how many applications does your organization receive on a monthly basis, and of those, how many are rejected?
17. What is the normal payment period?

18. How long do you wait before taking action on an unpaid account?

19. What is your normal policy with respect to unpaid accounts?

20. Do you feel that your system of credit extension (and overall policy) is adequate?

21. What improvements would you make if you had the opportunity?
APPENDIX II

QUESTIONNAIRE

Instructions

Below are listed fourteen various attributes that an applicant for credit may possess. A number line appears prior to the listing indicating the relative importance that might be assigned to the attribute in question. Choose a number on this line which most closely describes the importance of this customer attribute to the credit department in your opinion, and place the number in the space provided next to the characteristic listed. The number ranges are from unimportant (#1) to very important (#9).

1 5 9
unimportant moderately very important

a. Occupation
b. Number of children

c. Sex
d. Home owner
e. Bank references

f. Age
g. Has telephone
h. Marital status

i. Length of time at present address

j. Income bracket
k. Savings/checking account

l. Car owner

m. Length of time on current job

n. Geographic location of residence

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APPENDIX III
LIST OF FIRMS INTERVIEWED

A. **Banks (Savings and Loan)**
   1. First Federal Savings and Loan
   2. Montana Bank
   3. Northwestern Bank
   4. Central Bank of Montana
   5. First National Bank
   6. Great Falls Federal Savings and Loan
   7. Village Bank
   8. Eastside Bank of Montana

B. **Credit Unions**
   1. Malmstrom Federal Credit Union
   2. Great Falls Cooperators Federal Credit Union
   3. Montana Central Credit Union
   4. U. S. Employees Federal Credit Union

C. **Retail Stores**
   1. Sears Roebuck and Company
   2. Beckman's
   3. J. C. Penney Company Incorporated
   4. Montgomery Ward and Company
   5. Buttrey's Suburban
   6. Hested's Department Store
   7. Zales's
   8. Kaufmans, Inc.

D. **Loan Agencies**
   1. Liberty Loans
   2. Household Finance Corporation
   3. Nyquist Financial Services
   4. Aetna Loan Service
   5. Avco Loan Service
   6. Beneficial Finance
   7. Western Credit Company Incorporated

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## APPENDIX IV

### CREDIT SCORING GUIDE

*(Specific Characteristic Weights)*

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Number of Children</th>
<th>Residence</th>
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</thead>
<tbody>
<tr>
<td><em>(Weight = 7)</em></td>
<td><em>(Weight = 4)</em></td>
<td><em>(Weight = 5)</em></td>
</tr>
<tr>
<td>Unskilled</td>
<td>None</td>
<td>Rent</td>
</tr>
<tr>
<td>Skilled</td>
<td>One</td>
<td>Own</td>
</tr>
<tr>
<td>Technical</td>
<td>Two</td>
<td></td>
</tr>
<tr>
<td>Managerial</td>
<td>Three</td>
<td></td>
</tr>
<tr>
<td>Executive</td>
<td>Four</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Five</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bank References</th>
<th>Age</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(Weight = 6)</em></td>
<td><em>(Weight = 4)</em></td>
<td><em>(Weight = 5)</em></td>
</tr>
<tr>
<td>0</td>
<td>20 - 30</td>
<td>Not in Home</td>
</tr>
<tr>
<td>1</td>
<td>31 - 40</td>
<td>In Home</td>
</tr>
<tr>
<td>2</td>
<td>41 - 50</td>
<td></td>
</tr>
<tr>
<td>Slow</td>
<td>51 - 60</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>61 +</td>
<td></td>
</tr>
<tr>
<td>Prompt</td>
<td>61 +</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Marital Status</th>
<th>Time at Address</th>
<th>Income Bracket</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(Weight = 5)</em></td>
<td><em>(Weight = 6)</em></td>
<td><em>(Weight = 7)</em></td>
</tr>
<tr>
<td>Single</td>
<td>0-1 year(s)</td>
<td>7,500 - 9,999</td>
</tr>
<tr>
<td>Separated/Divorced</td>
<td>1-2</td>
<td>10,000-19,999</td>
</tr>
<tr>
<td>Widowed</td>
<td>3-5</td>
<td>20,000+</td>
</tr>
<tr>
<td>Married</td>
<td>6+</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Savings/Checking</th>
<th>Car</th>
<th>Time on Job</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>(Weight = 6)</em></td>
<td><em>(Weight = 3)</em></td>
<td><em>(Weight = 8)</em></td>
</tr>
<tr>
<td>Checking only</td>
<td>None</td>
<td>0-1 year</td>
</tr>
<tr>
<td>Savings only</td>
<td>Paying</td>
<td>1-2</td>
</tr>
<tr>
<td>Both</td>
<td>Owns</td>
<td>3-5</td>
</tr>
</tbody>
</table>

Max Score = 316
Cutoff = 187.5 = 316 + 59 \div 2
Low = 59
APPENDIX V
"TYPICAL" FIRM SIZE DATA

The following are data obtained from the firms that were interviewed during the course of the project. The categories involved are dollar amount of credit extended per month, dollar amount of receivables due at the end of a month, the number of applications received per month, and the number of applications rejected as a percent.

These data are an attempt to consolidate the results of questioning the various credit managers and loan officers in the area giving an extremely rough estimate of the operations of an "average" or "typical" firm in Great Falls.

It should be understood that this is a rough estimate because consideration was not given to business type, size or clientele per se. The main consideration given was to how credit is extended.
<table>
<thead>
<tr>
<th>Firm Number</th>
<th>Dollar Amount of Credit Extended Per Month</th>
<th>Dollar Amount of Receivables Due at End of the Month</th>
<th>Applicants Received Per Month</th>
<th>Applicants Rejected Per Month</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Unknown (Unk)</td>
<td>13,500,000</td>
<td>1000</td>
<td>10%</td>
</tr>
<tr>
<td>2</td>
<td>40,000</td>
<td>500,000</td>
<td>Unk</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td>65,000,000</td>
<td>1,500,000</td>
<td>60</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>475,000</td>
<td>9,000,000</td>
<td>Unk</td>
<td>Unk</td>
</tr>
<tr>
<td>5</td>
<td>450,000</td>
<td>60,000,000</td>
<td>300</td>
<td>3.3</td>
</tr>
<tr>
<td>6</td>
<td>50,000</td>
<td>600,000</td>
<td>Unk</td>
<td>75</td>
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<tr>
<td>7</td>
<td>Unk</td>
<td>Unk</td>
<td>Unk</td>
<td>20</td>
</tr>
<tr>
<td>8</td>
<td>Unk</td>
<td>Unk</td>
<td>Unk</td>
<td>40</td>
</tr>
<tr>
<td>9</td>
<td>Unk</td>
<td>28,000,000</td>
<td>Unk</td>
<td>Unk</td>
</tr>
<tr>
<td>10</td>
<td>85,000</td>
<td>85,000</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>11</td>
<td>Unk</td>
<td>Unk</td>
<td>Unk</td>
<td>Unk</td>
</tr>
<tr>
<td>12</td>
<td>Unk</td>
<td>3,300,000</td>
<td>Unk</td>
<td>Unk</td>
</tr>
<tr>
<td>13</td>
<td>1,000,000</td>
<td>4,500,000</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>14</td>
<td>100,000</td>
<td>Unk</td>
<td>70</td>
<td>40</td>
</tr>
<tr>
<td>15</td>
<td>225,000</td>
<td>225,000</td>
<td>250</td>
<td>40</td>
</tr>
<tr>
<td>16</td>
<td>Unk</td>
<td>Unk</td>
<td>100</td>
<td>80</td>
</tr>
<tr>
<td>17</td>
<td>125,000</td>
<td>100,000</td>
<td>70</td>
<td>4.3</td>
</tr>
<tr>
<td>18</td>
<td>80,000</td>
<td>1,500,000</td>
<td>75</td>
<td>33</td>
</tr>
<tr>
<td>19</td>
<td>Unk</td>
<td>Unk</td>
<td>Unk</td>
<td>Unk</td>
</tr>
<tr>
<td>20</td>
<td>Unk</td>
<td>38,000</td>
<td>150</td>
<td>80</td>
</tr>
<tr>
<td>21</td>
<td>240,000</td>
<td>240,000</td>
<td>45</td>
<td>15</td>
</tr>
<tr>
<td>22</td>
<td>Unk</td>
<td>Unk</td>
<td>Unk</td>
<td>Unk</td>
</tr>
<tr>
<td>23</td>
<td>100,000</td>
<td>90,000</td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>24</td>
<td>8,000</td>
<td>10,000</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>25</td>
<td>85,000</td>
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<td>34</td>
<td>44</td>
</tr>
<tr>
<td>26</td>
<td>116,000</td>
<td>125,000</td>
<td>Unk</td>
<td>Unk</td>
</tr>
<tr>
<td>27</td>
<td>Unk</td>
<td>Unk</td>
<td>Unk</td>
<td>Unk</td>
</tr>
</tbody>
</table>
As there is a noticeable discrepancy in amount extended and amount due because of the type of business, its size or other factors, the average would not present a meaningful figure. To provide a more accurate description of the "typical" firm, the median was taken in all cases.

<table>
<thead>
<tr>
<th>Dollar Amount of Credit Extended</th>
<th>Dollar Amount of Receivables Due</th>
<th>Applicants Received</th>
<th>Applicants Rejected</th>
</tr>
</thead>
<tbody>
<tr>
<td>65,000,000</td>
<td>60,000,000</td>
<td>1000</td>
<td>80</td>
</tr>
<tr>
<td>1,000,000</td>
<td>28,000,000</td>
<td>300</td>
<td>80</td>
</tr>
<tr>
<td>475,000</td>
<td>13,500,000</td>
<td>250</td>
<td>75</td>
</tr>
<tr>
<td>450,000</td>
<td>9,000,000</td>
<td>150</td>
<td>44</td>
</tr>
<tr>
<td>240,000</td>
<td>4,500,000</td>
<td>100</td>
<td>40</td>
</tr>
<tr>
<td>225,000</td>
<td>3,300,000</td>
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<td>40</td>
</tr>
<tr>
<td>125,000</td>
<td>1,500,000</td>
<td>75</td>
<td>40</td>
</tr>
<tr>
<td>116,000</td>
<td>1,500,000</td>
<td>70</td>
<td>40</td>
</tr>
<tr>
<td>100,000</td>
<td>1,000,000</td>
<td>70</td>
<td>39</td>
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<td>100,000</td>
<td>600,000</td>
<td>60</td>
<td>25</td>
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<td>85,000</td>
<td>500,000</td>
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<td>85,000</td>
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<tr>
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<td>225,000</td>
<td>25</td>
<td>10</td>
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<tr>
<td>50,000</td>
<td>125,000</td>
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<td>5</td>
</tr>
<tr>
<td>8,000</td>
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<td>4</td>
</tr>
<tr>
<td>8,000</td>
<td>85,000</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>8,000</td>
<td>38,000</td>
<td>3.3</td>
<td>3</td>
</tr>
<tr>
<td>8,000</td>
<td>10,000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Responsiveness (Number of firms giving an answer divided by the number of firms queried):

1. Credit Extension: 16/27 = 59%
2. Receivables Due: 19/27 = 70%
3. Applicants Received: 15/27 = 56%
4. Applicants Rejected: 18/27 = 67%

Medians:

1. Credit Extension: $116,000 + 100,000 = 216,000 ÷ 2 = $108,000
2. Receivables Due: $600,000
3. Applicants Received: 70
4. Applicants Rejected: 33% + 25% = 58% ÷ 2 = 29%
BIBLIOGRAPHY

Books


Articles


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Newspapers


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Booklets

Articles on Credit Scoring, Fair, Isaac and Co., Inc., (March 1974), 6-42.

Speeches