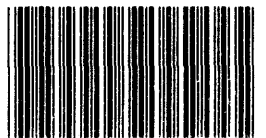

Development of a simulation game for the identification of entrepreneurial potential

Jan Boeyens



RGN·HSRC

PB097202



* P B 9 7 2 0 2 *

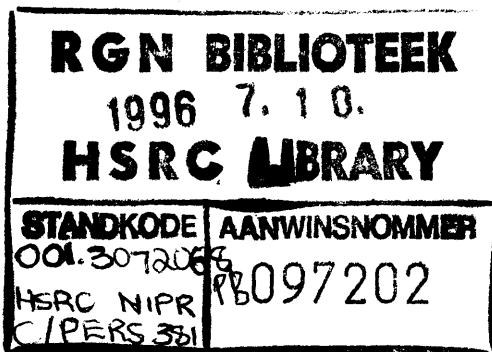
Development of a simulation game for the identification of entrepreneurial potential

C PERS 381

Development of a simulation game for the identification of entrepreneurial potential

Jan Boeyens

Pretoria
Human Sciences Research Council
1987



J.C.A. Boeyens, BA Hons

National Institute for Personnel Research

Executive Director: Dr. G.K. Nelson

ISBN 0 7969 0537 1

Human Sciences Research Council, 1987

Printed and published by HSRC
134 Pretoriusstreet
Pretoria

Acknowledgements

National Institute for Personnel Research
Dr G.K. Nelson, Executive Director

Test Construction Division
Dr T.R. Taylor, Divisional Head

Psychometrics

Mr. C.S. Chemel
Mrs. A. Du Toit
Miss. P. Holburn

NIPR/Library

TABLE OF CONTENTS

	PAGE
ABSTRACT	viii
EKSERP	ix
1 INTRODUCTION	1
2 PRELIMINARY INFORMATION-GATHERING EXERCISE	3
3 APPROACH ADOPTED FOR THE EVALUATION OF ENTREPRENEURIAL POTENTIAL	15
3.1 GENERAL COMMENTS	15
3.2 THE GAME	16
4 VALIDATION	22
4.1 EVALUATION OF BUSINESS SUCCESS	23
4.2 ANALYSIS	30
5 CHANGES MADE TO THE GAME	48
6 CONCLUSION	49
7 REFERENCES	52

LIST OF TABLES AND FIGURES

	PAGE
TABLE 1: Mean, standard deviation, minimum and maximum values of END ASSET	34
TABLE 2: Mean, standard deviation, minimum and maximum values of END ASSET; subjects under 45 year old	39
FIGURE 1: Percentage of the predictions (both selections and rejections) accurate at each cut-off point: END TOTAL predictor	33
FIGURE 2: Frequency distribution of the number of people scoring at each R25 000 interval	35
FIGURE 3: Percentage of the predictions (both selections and rejections) accurate at each cut-off point: END ASSET predictor	36
FIGURE 4: Percentage of the predictions of success accurate at each cut-off point: END ASSET predictor	38

	PAGE
FIGURE 5: Percentage of the predictions (both selections and rejections) accurate at each cut-off point in the under 45 year old sample: END ASSET predictor	41
FIGURE 6: Percentage of the predictions of success accurate at each cut-off point in the under 45 year old group: END ASSET predictor	42
FIGURE 7: Percentage of the predictions (both selections and rejections) accurate at each END ASSET cut-off point in the under 45 year old sample (impulsive testees are rejected)	45
FIGURE 8: Percentage of the predictions of success accurate at each END ASSET cut-off point in the under 45 year old sample (impulsive testees are rejected)	47

ABSTRACT

At the request of the Urban Foundation the NIPR undertook an investigation into the identification of individuals with entrepreneurial potential. NIPR researchers conducted interviews with successful and unsuccessful businessmen. During the interviews the researchers identified a number of characteristics that differentiated between the successful and the unsuccessful groups. A business simulation game was designed to assess these characteristics. Employees of the Urban Foundation tested people running small businesses, and a consultant independently assessed these people according to a number of relevant criteria. A variable derived from the game, END ASSET, proved to be effective in predicting business success. By using an optimal cut-off point, successful businesspeople under the age of 45 could be identified with a 90 % degree of accuracy when END ASSET was used in conjunction with a measure of impulsivity derived from the game.

EKSERP

Na aanleiding van 'n versoek deur die Stedelikke Stigting het die NIPN onderneem om ondersoek in te stel na die moontlikheid om entrepreneurspotensiaal te identifiseer. NIPN navorsers het onderhoude met sowel suksesvolle as onsuksesvolle sakemanne gevoer. Tydens die onderhoude het verskeie eienskappe wat tussen die twee groepe kon differensieer, aan die lig gekom. Die meting van hierdie eienskappe is vervat in 'n besigheidspel. Werknemers van die Stedelikke Stigting het mense wat klein sake bedryf getoets, en 'n konsultant het onafhanklik data versamel volgens 'n aantal relevante kriteria. Daar is bevind dat 'n veranderlike, END ASSET, besigheidssukses bevredigend kon voorspel. Deur gebruik te maak van 'n optimale afsnypunt, was dit moontlik om suksesvolle sakelui jonger as 45 jaar met 'n akkuraatheid van 90 % te identifiseer deur middel van 'n kombinasie van END ASSET en 'n meting van impulsiwiteit wat ook van die spel afgelei word.

1 INTRODUCTION

In February 1986 the government announced the central business districts of Johannesburg and Durban free trading areas. This appears to be another step in the process of removing legislation which hinders the development of black businessmen (Smuts 1986). There is a growing realization of the importance of developing entrepreneurial potential in South Africa. Nevertheless some authors such as Pottas (1986) believe that the government seems to underestimate the immense economic potential of entrepreneurs for the growth of this country. Identifying potential black entrepreneurs so that they can be given assistance in the development of their businesses is often seen to be of cardinal importance to long term economic survival (Andrews 1986). Pottas (1985) states that entrepreneurs can be viewed as the creators of employment for others. He asserts that much more can and should be done to increase both the quality and quantity of entrepreneurs in South Africa.

Jooste (1986) cites legislation and lack of capital as two of the main causes of the limited development of entrepreneurial potential in South Africa. The quality of entrepreneurs and the availability of capital are the crucial ingredients for creating new markets and industries, and thus for stimulating much needed economic growth (Andrews, 1986).

The Urban Foundation is one of the organizations which realizes the importance of fostering the development of black entrepreneurs in South Africa. This organization approached the NIPR in the first half of 1986 and engaged its services to develop a means of identifying entrepreneurs. The Urban Foundation indicated that it intended to mobilise a large amount of capital from established financial institutions for on-lending to viable businesses in the informal sector. Mr. Keith Foster, who represented the Urban Foundation, indicated that the organization wished to optimize the effectiveness of its program by persuading the banks to lend money to individuals who would be likely to generate work opportunities for others. These genuinely entrepreneurial individuals contrast with "survivors" who merely "keep their heads above water", but do not expand their businesses or create work opportunities for others.

Entrepreneurs are not necessarily the people who manage large concerns. One cannot equate entrepreneurial talent with managerial skills (see e.g. Pottas, 1983, and Stevenson & Gumpert, 1985, see also Kanter, 1986). Entrepreneurs are innovators, the inventors and the explorers of new possibilities that any economy needs (Schuler, 1986). They turn opportunities into profitable activities (Pottas, 1985).

Business counsellors at the Urban Foundation indicated that skilled evaluators can identify a true entrepreneur relatively easily. Pottas (1983, 1985), however, suggests that the

identification of entrepreneurial potential is difficult even for experienced evaluators. It seems safe to say however that the ability to identify an entrepreneur is probably the result of years of experience with people involved in business. The assignment given to the NIPR by the Urban Foundation was to develop a method of identifying entrepreneurial potential which could be used by people with less skill and experience.

2 PRELIMINARY INFORMATION-GATHERING EXERCISE

It was deemed necessary to obtain first-hand information on the characteristics of successful and unsuccessful businessmen. Consequently the Urban Foundation arranged various meetings between businessmen and NIPR researchers. Six successful and six unsuccessful businessmen were interviewed during these meetings. The successful businessmen were all clearly elevated above the level of informal sector operations. They all owned and ran relatively large, expanding enterprises. The unsuccessful group on the other hand consisted of individuals who were struggling to make ends meet. Some of these individuals seemed unable to move out of the informal sector into larger scale operations. Others were beyond the level of strictly informal sector operations, but were experiencing severe financial problems.

The aim of this study was to find a means of distinguishing between potentially successful entrepreneurs and so-called "survivors". The interviews were therefore directed toward the uncovering of characteristics that were shared by members within each of the two groups, and that could differentiate between the successful and unsuccessful groups. The following discussion summarizes the characteristics which were identified from the interviews.

A most striking feature of the successful businessmen was that they all had a work history that was of relevance to their subsequent business ventures. They seemed to have gradually drifted into ventures for which they were well prepared in terms of relevant knowledge and experience. Once established as businessmen they tended to branch into highly related fields. The following work history of an interviewee can serve as an illustration. Mr. A was a builder for five years, then supervised building operations for ten years. During this time he started doing private building jobs. He subsequently quit his job and devoted himself to full-time building. He is currently the employer of a large number of people and has recently branched into the related field of manufacturing bricks.

All the successful businessmen displayed this pattern of undertaking business ventures only in domains in which they had a reasonable level of knowledge and expertise.

The above characteristic was not exclusive to the successful group. However it was only among the unsuccessful businessmen that deviations from this rule occurred. One of the "survivors" interviewed was running a knitting operation, but all his formal employment life had been spent as a mechanic. It seemed that some members of the unsuccessful group underestimated the value of hands-on experience. Some of them did not seem to make any effort to obtain the know-how they so obviously lacked.

Significantly members of the successful group were the ones who continually stressed the importance of obtaining knowledge from experts. They all felt that one can never cease learning from others. They all asserted that they were active information and expertise gatherers. One of them indicated that he often visited his previous full-time employer to gather information, ask advice, and pick up hints. MacMillan (1983) suggests that the seeking of others' opinions also often serves the additional purpose of building solid relations with valuable business contacts.

Most members of the unsuccessful group indicated that they were in desperate need of help. They saw the "bad times", the competition, or the lack of markets, as the cause of their problems. It never seemed to occur to them that it could be their general approach, or their lack of relevant knowledge and expertise that was to blame. Consequently they did not actively seek advice, information or know-how, because they mistakenly

blamed various outside forces for their failures. While the successful businessmen often turned to a mentor such as an uncle, a friend's father, or a previous employer for advice, the unsuccessful businessmen seemed not to have considered the possibility of seeking advice from knowledgeable or influential people.

The unsuccessful businessmen seemed more set in their ways. They had a recipe for running a business, and even though it was obviously not working, they seemed not to realise the need for change. Advice given to such an individual will be of very limited use. The successful businessmen repeatedly indicated that they would take advice from anybody, evaluate any suggestions, and follow any new viable approaches to the running of their concerns. The literature supports this observation by suggesting that one of the most important features of the entrepreneur is flexibility (e.g. Stevenson and Gumpert, 1985). A panelbeater, who was one of the unsuccessful businessmen interviewed, provides a contrasting example. He was not making ends meet because his competition was drastically undercutting his prices. When asked the reason for this, he replied that they could afford to cut prices because they employed less labour. When asked why he was overstaffed, he answered that you need one man to sand, one to fill, one to paint...etc. Although it was clear from the activities of the competition that such specialization was not necessary, this individual never thought of changing his methods to be more in line with those of his

successful rivals. Another example was a roof carpenter who was getting less and less business because his competition was allowing customers to pay in a few instalments for the work done. He wanted the money for the work "up front". While he understood perfectly well how his competition actually made a larger profit from their method of selling, he was just unable to envisage his own business running on the same basis. The "worst" case was a window frame manufacturer (a welder). He went into this business because the Urban Foundation offered him a contract to manufacture a quantity of steel frames. After the contract had been completed, he passively waited for more contracts to manufacture steel windows. He had no transport, so he could not go out and look for contracts. Basically, he sat at home waiting for a contract to "fall into his lap". He indicated that he needed help (but by this he did not mean the kind of help that the successful businessmen were actively seeking all the time).

Therefore, while the successful businessmen seem conservative - because they move into highly related fields - they are simply being sensible. Similarly Pinchot (1985) stresses that the idea that an entrepreneur is a high risk taker is a myth. In contrast the unsuccessful businessmen often go into unsuitable fields for which they do not possess adequate experience; they also get set in their (inadequate) ways and are unable and unwilling to make any adjustments. The successful businessmen are willing to consider alternatives, to take advice and make changes, provided they are convinced that they will be for the better. Members of

the unsuccessful group seem to make major decisions based on insufficient information, and then fail to make necessary changes when they have adequate information to make rational and productive changes.

The successful businessmen generally left their regular employment by choice. Often members of the group were still on good terms with their previous employers after having left. They resigned because they envisaged better prospects outside the regular employment environment. In contrast two of the unsuccessful businessmen interviewed were dismissed from their regular jobs. One of them indicated that he would definitely still be regularly employed, if he could find a job. While the successful group as a rule moved from regular employment toward better prospects, the unsuccessful businessmen were sometimes forced out of regular employment, and were using the informal sector for survival. The successful businessmen were therefore motivated by positive factors while the unsuccessful businessmen were motivated by negative factors.

The amount of time and work that the successful and unsuccessful businessmen put into their businesses did not appear to differ greatly. It was, however, obvious that some of the unsuccessful businessmen concentrated on those aspects of the business that interested them, while neglecting other aspects. This problem was particularly evident in those businessmen running manufacturing concerns. These businessmen seemed to spend all

their time in the workshop, producing high quality products. However, by their own account, the main problem with the businesses was inadequate marketing. They were cluttering up their workshops by stockpiling manufactured goods. They seemed not to be making any effort to overcome the lack of demand they were experiencing. A steel gate manufacturer did not seem to realise the contradiction in the following: He wanted somebody else to pay his bills (electricity, rent etc), and to go out and look for contracts and customers. He was not interested in "that side". All he wanted to do was work in the workshop, but nevertheless saw this as working for himself.

It appears that while the amount of hours spent at work does not differentiate between the two groups, the intelligent apportioning of time does. Without exception the successful businessmen created the impression that they were in touch with the entire operation. One transport contractor even sometimes secretly followed his truck drivers in a pick-up truck, to see if they were doing their work properly.

Another marked difference was in the employee relations of successful and unsuccessful businessmen. The successful businessmen sometimes had one or two subordinates whom they trusted, but on the whole they did not exhibit much regard for their employees. They all indicated that it is naive to trust one's employees, and most had very high staff turnovers. The unsuccessful businessmen felt attached to their staff. They kept

staff even when they could ill afford to do so. They indicated that they felt sorry for their employees, and hated having to fire them, even when these employees took advantage of them.

Interpreting this difference between the two groups of interviewed businessmen should, however, be undertaken with caution. Reich (1987) and Pinchot (1986) argue that the truly successful business of the future will have highly informal structures, where the contributions of all employees to the growth of the business are valued. They argue that the entrepreneurial qualities of employees will need to be exploited by the successful employers of the future; that within each venture the gap between the entrepreneurs and the "drones" will have to be closed. Reich argues that "entrepreneurial teams" have far more potential than the traditional enterprise with one entrepreneur and several labourers. Kanter (1986) and Kaplan (1987) suggest that this "entrepreneurial team" notion is fraught with difficulties and creates as many new problems, such as raised employee expectations and difficulties with methods of remuneration as it solves old ones. Kaplan (1987) highlights the difficulty in attempting to interpret the significance of employee relations further by arguing that the traditional distinction drawn between entrepreneurs and managers is misleading. He challenges the validity of the popular practice of drawing extensive lists of the differences that supposedly exist between the typical entrepreneur and the typical manager. He suggests that the two types are not easily separated and

questions whether it is possible to be an effective manager without some entrepreneurial qualities. Pottas (1985) goes on to suggest the existence of two types of entrepreneurs some of whom easily adapt to the role of manager, while others only create new ventures and avoid any form of management. It seems that the disregard that the successful businessmen displayed towards some of their employees, while fitting in with the popularized maverick notion of entrepreneurship, is not supported by all the experts' and academics' conceptions of entrepreneurship and can therefore not be justified as a means for differentiating between people with entrepreneurial potential and those without potential.

The unsuccessful businessmen had severe negative self-concepts. While all the successful businessmen radiated self-confidence, the unsuccessful ones had little self-esteem. It is impossible to determine which came first, high self-esteem or success. Although this may constitute a striking difference between the two groups, it is probably of limited empirical usefulness.

The successful businessmen all indicated that they did not take any unnecessary risks in business. They did not gamble. They all agreed, however, that in business it is sometimes necessary to take calculated risks. They indicated that chances must only be taken when one is "sure" the odds are stacked in one's favour. They all seemed to maintain substantial saving accounts. In addition the amount of capital spent on new

developments never seemed to amount to more than the business could bear with ease. Members of the unsuccessful group all suffered from severe cash flow problems. Individuals in this group either took no risks (and hence made no progress in business) or made impulsive and ill-considered decisions which cost their businesses money.

Another feature that was observed in the successful group was that of "delayed gratification". Although members of this group apparently had huge bank accounts, they lived in the same simple houses in which they had lived for years. Some had grandiose dreams about spending money on luxuries like overseas trips, but they seemed to be putting these off. However, they did spend some money on luxury items. A number of them drove expensive German cars, and certainly none of them seemed to save money at the expense of their own comfort. It was impossible to compare the unsuccessful group on this count; they just did not have money, so they were forced to delay buying any luxuries.

There was however a difference between the two groups in terms of the proportion of money ploughed back into the business relative to the proportion spent on personal goods and services. The successful group all indicated that they ploughed vast amounts of profit back into the business. The failures mostly indicated that they needed all their "profits" to survive. One of them banked his profits to see him through hard times. The unsuccessful businessmen seemed less able to separate their

personal lives from their business ventures. They sometimes complained that their wives were spending too much money. The successful individuals on the other hand often exploited the clerical skills of their wives for some of the more mundane aspects of the business.

The above observations suggest that business success is best described in terms of the ability to take full advantage of a situation, rather than in terms of specific personality traits of the individual. The failures were caught up in a situation larger than themselves, and they saw the causes of their problems as vague and undefined. The successes knew the workings of their businesses inside out. They were able to see the bigger picture, and to make sound decisions. Some of them even pushed money directly into the communities within which they operated. One businessman sponsored a soccer team (the pay-off was that the players wore shirts advertising his business); another gave bursaries to a few youths to go to university (a highly commendable act which is also tax-deductible). One of the successful businessmen reflected that the public was aware of its buying power, and that it was essential to stay on the right side of this power.

The characteristics that differentiate the two groups from each other can be summarized as follows:

SUCCESSFUL ENTREPRENEURS

FAILURES

- | | |
|---|--|
| 1) CONTINUALLY EXPAND BUSINESS | MAINTAIN BUSINESS |
| 2) EXPAND INTO RELATED FIELDS | EXPAND HAPHAZARDLY |
| 3) ACTIVELY SEEK AND USE
RELEVANT INFORMATION | DO NOT SEE THE NEED TO GATHER
INFORMATION |
| 4) ARE FLEXIBLE AND ABLE TO
ADAPT TO NEW CIRCUMSTANCES | ARE INFLEXIBLE AND QUICKLY
GET INTO A RUT |
| 5) TAKE CALCULATED RISKS | SEEM TO MAKE IMPULSIVE DECISIONS |
| 6) DELAY GRATIFICATION
PLOUGH ALL PROFITS INTO
BUSINESS | CANNOT PLOUGH BACK PROFITS DUE
TO SEVERE FINANCIAL PROBLEMS |
| 7) ARE ABLE TO SEPARATE
BUSINESS AND PRIVATE WORLDS | ARE NOT ABLE TO SEPARATE
BUSINESS AND PRIVATE WORLDS |

SUCCESSFUL ENTREPRENEURS

FAILURES

8) USE TIME INTELLIGENTLY

WORK HARD BUT UNPRODUCTIVELY

9) DO NOT DISPLAY MUCH
REGARD FOR WORKERS

FEEL INDEBTED TO EMPLOYEES

10) ARE GENERALLY ON AMICABLE
TERMS WITH PREVIOUS
EMPLOYERS

COULD HAVE BEEN FIRED FROM
PREVIOUS EMPLOYMENT

3 APPROACH ADOPTED FOR THE EVALUATION OF ENTREPRENEURIAL POTENTIAL

3.1 GENERAL COMMENTS

It was decided that to try to predict business success using personality traits would be a fruitless exercise. A situational - behavioural approach appeared to be more appropriate. The successful entrepreneur is the person who takes the correct actions and makes the right decisions. To attempt to predict these, using measures of constructs such as self esteem, capitalist ethics, or affiliation needs, would not be the most sensible approach. It was decided to use a simulation exercise for the assessment of entrepreneurial potential. A simulation exercise would permit most of the abovementioned characteristics

to be monitored and evaluated. The simulation was designed to make possible the evaluation of the critical behaviours discussed above. It took the form of a business game.

3.2 THE GAME

The business game was constructed in an attempt to create an environment with which the testee could identify. In the game the testee has to deal with some fairly typical business situations; he has to make complicated decisions, sift through large amounts of often irrelevant information, integrate relevant information, make choices (sometimes on insufficient information), and take action.

In this section the simulation game will be discussed and an indication given of how some of the observations discussed in the previous section were incorporated into the game. The profiles of successful and unsuccessful businessmen, derived from the interviews, were the main input in the design of the game.

At the beginning of the game the player receives some money and two shops, one type A and one type B. In addition the player is given a photograph representing his or her current house. The game is divided into "months", 24 in all representing two "years". During each month (except the first), the testee must buy stock for his shops. At the end of each month money is paid

out for the value of his sales. The maximum possible sales for all products are predetermined for every consecutive month, and follows certain pre-planned patterns. In addition to purchasing stock, the testee is given opportunities to buy additional shops, to upgrade his current house, to buy cars, and LDV's, to buy a soccer team, to gamble, to take out loans, to pay variable amounts of money for the education of his children, and to donate money to charities and other organizations. The testee is told that the aim of the game is to set himself up as a successful businessman by the end of the game. His personal definition of what "success" means will therefore have an important and relevant influence on the choices he makes. A discussion of the important aspects of the game is given below. These aspects will be related to the characteristics of successful and unsuccessful entrepreneurs.

1) The testee is given 14 opportunities to buy shops during the game. On average this amounts to just over one opportunity every two months. Shops are extremely cheap in the game. A new shop will pay for itself in a matter of two to three months. In addition the testee is allowed to buy up to ten shops of a particular type. Seven types, in all, are available, designated by letters A to G. The testee who buys more shops will make more money. Expansion is a profitable operation (although some forms of expansion are more profitable than others). The testee who expands will have a large amount of capital by the end of the game. It was expected that the typical "survivor" would be

content merely to "hang onto" the two shops with which he started, or to expand only to a very limited extent. The "survivor", it was thought, would have his hands so full just deciding how much stock to put inside each of his few shops, and consequently fail to expand. The entrepreneur on the other hand was expected to expand rapidly, and to take full advantage of the favourable conditions the game presented.

2) The testee is given the opportunity to buy up to ten shops of a given type. This enables the entrepreneur who wants to expand into similar (or identical) fields the opportunity to get a strong business under way, before additional expansion necessitates moving into new areas. The game was structured to enable those testees who buy type A and B shops to make large profits at the beginning of the game. The testee therefore benefits by expanding in the domains in which he started rather than in other domains. Large profits at the beginning of the game will put the testee at a substantial advantage. A good start has a pronounced effect on the amount of capital the testee will have at the end of the game.

3) Since a difference in attitude towards advice and information was observed between the successful and unsuccessful businessmen who were interviewed, it was decided to incorporate this into the game. At the beginning of almost every month several "information cards" are placed in front of the testee. These cards contain both relevant and irrelevant information. None of

the cards contains information essential for understanding the game, but some have information essential for doing well in the game. The side of the card facing the testee bears a short statement indicating what sort of information is contained on the other (concealed) side of the card. The testee must decide which cards he wants to read. The instructions to the testee are very non-committal; he is told that he may turn over any number of the cards, that he may keep any number of those turned over; he can also give them back. Some people are extremely cautious, and read very selectively, not turning over many cards. Some turn over all the cards casually, hardly glancing at the contents. Others study the cards at length, arrange them into piles, etc. All questions the testee asks regarding the cards are answered evasively. The testee is, however, told that a record is kept of the cards read and returned, cards read and kept and cards never read. The interpretation of how the use of information cards is assessed is left entirely up to the testee.

It was thought that the true entrepreneur would believe that all information should be examined, as it could assist him. The "survivor" on the other hand would see the cost involved in obtaining information as outweighing the potential benefit of the information or would regard the information as unimportant and not worth looking at. The information on the cards is of such a nature that its intelligent use can greatly enhance a player's chances of making large profits. In order to play really well the testee needs to integrate the information on the cards with

the actual occurrences in the game. As an example the information on the average of the previous year's demand for produce will be considered. The testee can use these figures for planning his inventory requirements. However, only when this information is compared with the current sales in the game will the market patterns (true level of demand) become apparent.

The information cards were thus designed to provide the skilful user with an advantage over the non-user or the unskilful user. The effective use and integration of the information on the cards will be reflected in the capital and assets of the testee at the end of the game.

4) In the middle of the game the sales in one of the shops, given to the testee at the beginning (type B), decline to zero. In order to continue making a substantial profit, the testee who has not yet branched out will need to do so by acquiring other shops. Changes in the demand for products are designed to assess the flexibility and responsiveness of the testee. Successful businessmen should be able to follow the markets of all kinds of stock of relevance to them, while the "survivors" are likely to be unable to adjust to changes. An inability to adjust to changes in demand will seriously affect the amount of capital a testee will have at the end of the game. Conversely the ability to adapt and also to predict future trends based on previous knowledge will greatly enhance the success of a testee. In other

words the amount of capital and assets the testee owns at the end of the game will to a large extent be indicative of his or her ability or inability to adjust to change.

5) During the game the testee is given a total of four opportunities to "gamble". The testee decides the amount of money he wants to risk. A dice is used, and the odds for winning or losing are 50/50. Those who are willing to take gratuitous risks can be identified in this way. A testee who gambles small amounts may just be enjoying the game. Excessive gambling, however, may be indicative of a propensity to take unnecessarily large risks, and could constitute grounds for rejecting the loan applicant.

6) The ability of the player to separate his personal and business life and his willingness to plough most of his money back into the business was assessed by offering him opportunities to spend money on personal goods. These include an entire range of motorcars, a few LDVs, and a range of houses that span the entire economic spectrum. The testee is given various opportunities to buy LDVs, cars and houses. He does not need to buy any of these, and in fact it was thought that the successful entrepreneur would not spend money on any of these articles. The initial plan was to penalize testees for buying houses, cars and LDVs. It became apparent, however, that spending money on articles automatically penalized the testee to a sufficient degree. Investing in a house, for example, drains the testee's

money, and automatically leaves him less money to plough back into his business, which in turn results in smaller profits, and ultimately fewer business assets and less capital at the end of the game. The ability to separate business from personal life, and the tendency to plough profits back into the business will thus be reflected automatically in the eventual assets of the testee. Therefore no extra penalty for buying personal property was imposed.

4 VALIDATION

After the initial testing of various NIPR staff members as well as six business people some changes to the game were made before the validation exercise commenced. Four potential test administrators and three Urban Foundation counsellors were trained. Four of these were eventually deemed capable of proper administration of the game. The Urban Foundation hired three of these to administer the game. The design of the validation exercise called for the testing of 50 successful and 50 unsuccessful people in business.

A typical administration of the game takes between one and a half and three hours - excluding the time spent setting up the game, and packing it up again afterwards. It was regarded as somewhat unreasonable to expect a tester to test more than two people a day. In addition the testers had to travel to the premises of

the businessmen, making even the testing of two people a day a rather demanding task. The three testers commenced testing in November 1986. By March 1987 they had tested 80 people. The Urban Foundation indicated that they wanted the validation to be done on this sample, since the trained testers had all left their employ.

To make sure that the successful and unsuccessful groups could be adequately differentiated from each other, a questionnaire was constructed to assess business success. This questionnaire was administered by an independent consultant and was applied to all the people tested on the game. In the following section the evaluation of business success as well as problems encountered in this exercise will be discussed.

4.1 EVALUATION OF BUSINESS SUCCESS

The consultant used the questionnaire to evaluate the business of each testee in terms of five dimensions. In addition biographical information was obtained (name, age, sex, language, location of premises, type of business activities involved with). The five dimensions and the subdimensions within them are presented below. The questions asked as well as the actual ratings performed are given in brackets.

1) FINANCE

a) Asset control

(How often does he renew assets ?)

(Rate the appropriateness of his asset control policy for the business he is in)

b) Credit policy

(How many people does he lend money to ?)

(How long does he take to collect debts ?)

(Rate the appropriateness of his credit policy for the business he is in).

c) Turnover

(Are his profit margins high enough for him to make an adequate profit ?)

(Rate the appropriateness of his turnover policy for the business he is in).

d) Borrowing

(How often does he borrow money ?)

(Rate the appropriateness of his attitude toward borrowing for the business he is in).

e) Cash flow

(Does he have adequate money to see him through each month?)

(Rate the appropriateness of his cash flow policy for the business he is in).

f) Handling of tax

(How much tax does he pay ?)

(Rate the appropriateness of his handling of tax for the business he is in).

2) MARKETING

a) Location of business

(Rate the appropriateness of his location for the business he is in).

b) Promotions

(How much advertising / promotions does he do ?)

(Rate the appropriateness of his advertising policy for the business he is in).

c) Product presentation

(How much effort goes into making the product desirable ?)

(Rate the appropriateness of his attitude towards his product(s) for the business he is in).

d) Price

(How low (competitive) are his prices ?)

(Rate the appropriateness of his pricing policy for the business he is in).

e) Targeting

(Rate the appropriateness of his targeting skills for the business he is in).

3) PERSONNEL

a) Recruitment

(Does he have a high staff turnover ?)

(Rate the appropriateness of his recruitment policy for the business he is in).

b) Treatment of staff

(How paternal is he towards his staff ?)

(How strict is his discipline ?)

(Rate the appropriateness of the way he treats his staff for the business he is in).

c) Salaries

(How much does he pay his employees - compared with other employers?)

(Rate the appropriateness of his wage policy for the business he is in).

d) Training

(To what extent does he invest time and effort in his employee's training ?)

(Rate the appropriateness of his attitude toward training for the business he is in).

4) OPERATIONS

a) Production method

(Is his technology up to date ?)

(Rate the appropriateness of his technology for the business he is in).

b) Inventory control

(How is his inventory control during all three of the production stages ?)

(Rate the appropriateness of his inventory control policy for the business he is in).

c) Maintenance

(Is expensive equipment looked after or thrown away when old ?)

(Rate the appropriateness of his maintenance policy for the business he is in).

d) Quality control

(Is quality control strict ?)

(Rate the appropriateness of his quality control policy for the business he is in).

5) EXPANSION

(Is he enough of a manager to move away from being an entrepreneur toward being the manager of a larger business?)

The consultant also commented on the businesses. These comments were very useful for an initial ordering of testees.

The sample tested was a totally "random" sample, and therefore not divisible into the two proposed groups of successful and unsuccessful. Before turning to this aspect of the study, it is relevant to briefly discuss the administration of the game.

The three testers (hired on a part time basis by the Urban Foundation), tested 80 people. It soon became evident that the first few administrations of the game were riddled with errors.

Various mistakes were made by the testers. The fact that later administrations (by the same testers) were relatively error-free underlines the need for thorough training of the testers, and of the necessity for extensive practice in the administration of the game.

The Urban Foundation would be well advised to ensure that any counsellor entrusted with the assessment of any potential loan applicant be very well versed in the administration of the game. A testee can only be tested once (using this game), because on a second testing session he will have an unfair advantage.

Adjustments were made for most of the errors detected. However some administration sheets were so poorly completed that the cases in question had to be abandoned. Five cases were discarded because the detected errors during stock takings were larger than the testee's actual capital on hand. An additional seven cases were discarded because one of the administrators misunderstood one of the rules of the game. Below is a summary of all the cases that were excluded from the data set:

- 1) 5 cases : Errors detected were so large that it was impossible to adjust the assets of the testees post hoc.
- 2) 7 cases : Tester did not allow testees to buy stock during months when they purchased shops.

3) 6 cases : These individuals were not in business; there was therefore no valid criterion data for these people.

4) 2 cases : Mistakes were made with the identity of these individuals with the result that criterion data were not collected.

5) 4 cases : These individuals were not fully responsible for the running of their concerns. Kets de Vries (1985) asserts that good employees of a successful concern are not necessarily themselves entrepreneurs. The ratings of these people may therefore have been misleading.

6) 2 cases : A chemist and a medical doctor. These people were undoubtedly in business, but it was felt that their superior educational backgrounds would give them an advantage in the game.

A total of 26 cases was therefore removed from the initial data set. The remainder of this discussion will concern itself with the remaining 54 cases.

4.2 ANALYSIS

Since representatives of the Urban foundation indicated that they wanted to be able to administer and score the test quickly, the scoring of the game was kept as simple as possible. The simplest and most obvious score consists of the business assets of the testee at the end of the game. This figure must be adjusted for the value of any loans still outstanding. This score is called "END TOTAL". It is expressed as follows:

$$\text{END TOTAL} = (\text{money total}) + (\text{total value of shops}) - (\text{any outstanding loans}).$$

The initial criterion score (to determine actual business success) was a composite score derived from the questionnaire discussed above. Each of the five categories were equally weighted, and a composite score calculated. The composite score obtained from the questionnaire showed that almost no relationship existed between business rating and END TOTAL. It was thought that the reason for this non-significant relationship might be due to the type of business ratings used. The questionnaire does not take the "potential" of the business into consideration. In addition the ratings required in the questionnaire are somewhat business-specific. Scores are therefore not genuinely comparable across individuals. A further problem was that the rater had used only the middle categories of the rating scales. Ranges were consequently restricted.

As a partial solution to these problems it was decided to ask the consultant to order all the cases he evaluated from "worst" to "best". He was told to take current assets, rate of expansion, and, "potential" of the testee into consideration. These ratings were used as the criterion for the remainder of the analysis. The sample was divided in half, with the top 50 % constituting the "successful group" and the bottom 50 % constituting the "failures". This division is of course arbitrary, but it is the best that can be achieved in the absence of more precise criteria of success and failure.

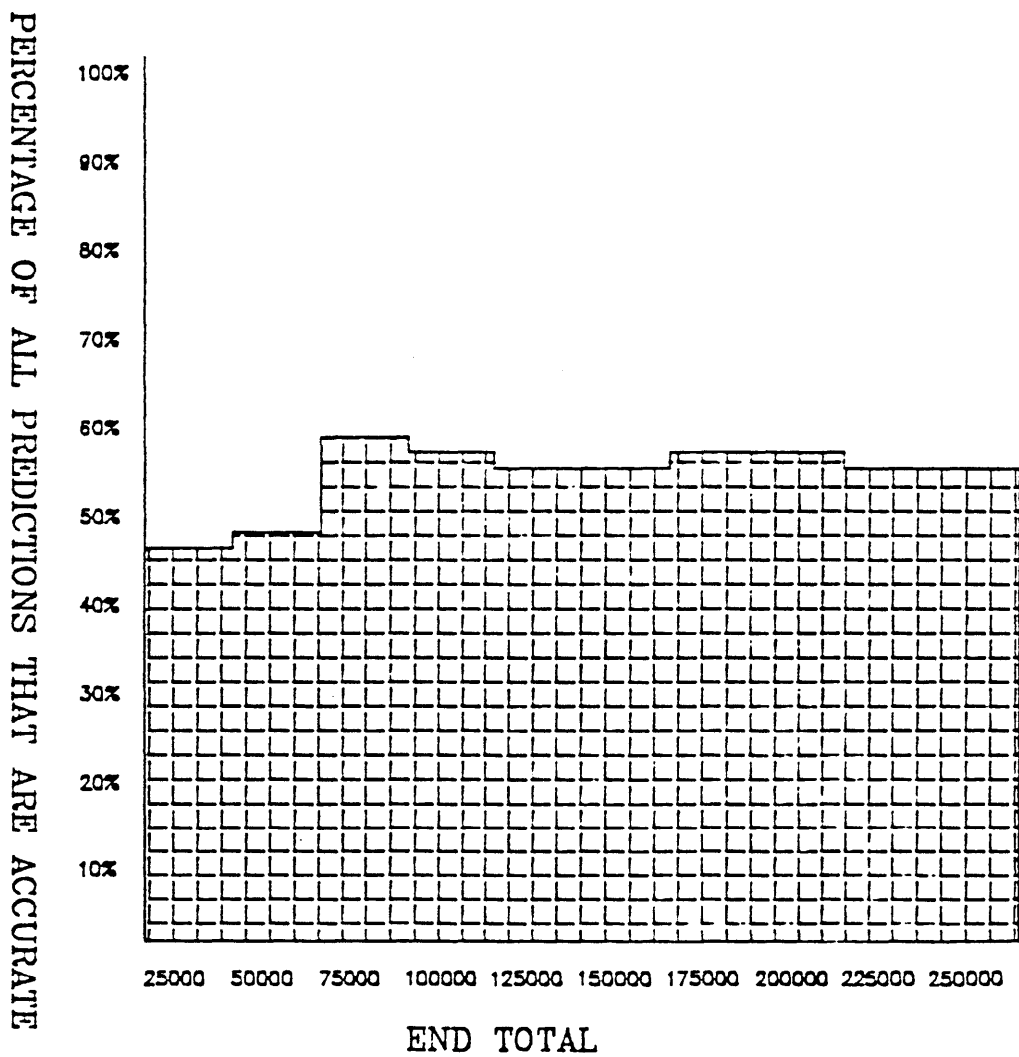
END TOTAL as a means of classifying individuals into the successful and unsuccessful categories was investigated. The effectiveness of classification was examined at various cut-off points separated by intervals of R25 000. The ideal is a cut-off according to which all the failures would fall below this particular value and the successes would fall above it. In practice this never happens and two types of errors occur: 1) Those individuals who should be rejected are selected, and 2) those individuals who should be selected are rejected. The aim is to minimize these errors. From the point of view of the Urban Foundation it is presumably of particular importance to minimize the occurrence of the former type of error.

Figure 1 shows the percentage of accurate predictions made at each cut-off point. The number of accurate predictions can be defined as the number of "successes" selected plus the number of "failures" rejected at any particular cut-off point.

It is clear from FIGURE 1 that END TOTAL is not a useful index for predicting business success. Accuracy of prediction varies little across the whole spectrum of END TOTAL values. One of the problems with END TOTAL is that errors made by the tester in the administration of the game are not corrected . Also the non-business assets of the testees are not reflected.

FIGURE 1

Percentage of the predictions (both selections and rejections)
accurate at each cut-off point: END TOTAL predictor



Another index called "END ASSET" was calculated. END ASSET is expressed as follows:

END ASSET = (END TOTAL) + (total value of all cars and all LDVs) + (value of current house) + (amount paid for a soccer team) + (all errors made against the testee) - (all errors made that favoured the testee).

TABLE 1 gives the mean, standard deviation, minimum score and maximum score on END ASSET.

TABLE 1

Mean, standard deviation, minimum and maximum values of END ASSET

<u>VARIABLE</u>	<u>N</u>	<u>MEAN</u>	<u>S.D.</u>	<u>MINIMUM</u>	<u>MAXIMUM</u>
END ASSET	54	126 322	56 562	66 750	309 400

FIGURE 2 is a frequency distribution of END ASSET scores.

The majority of testees scores between R75 000 and R125 000. It is relevant to determine how accurate END ASSET predicts success at each of these levels.

FIGURE 3 shows the percentage of predictions that were accurate at each cut-off point on END ASSET.

FIGURE 2

Frequency distribution of the number of people scoring at each R25 000 interval

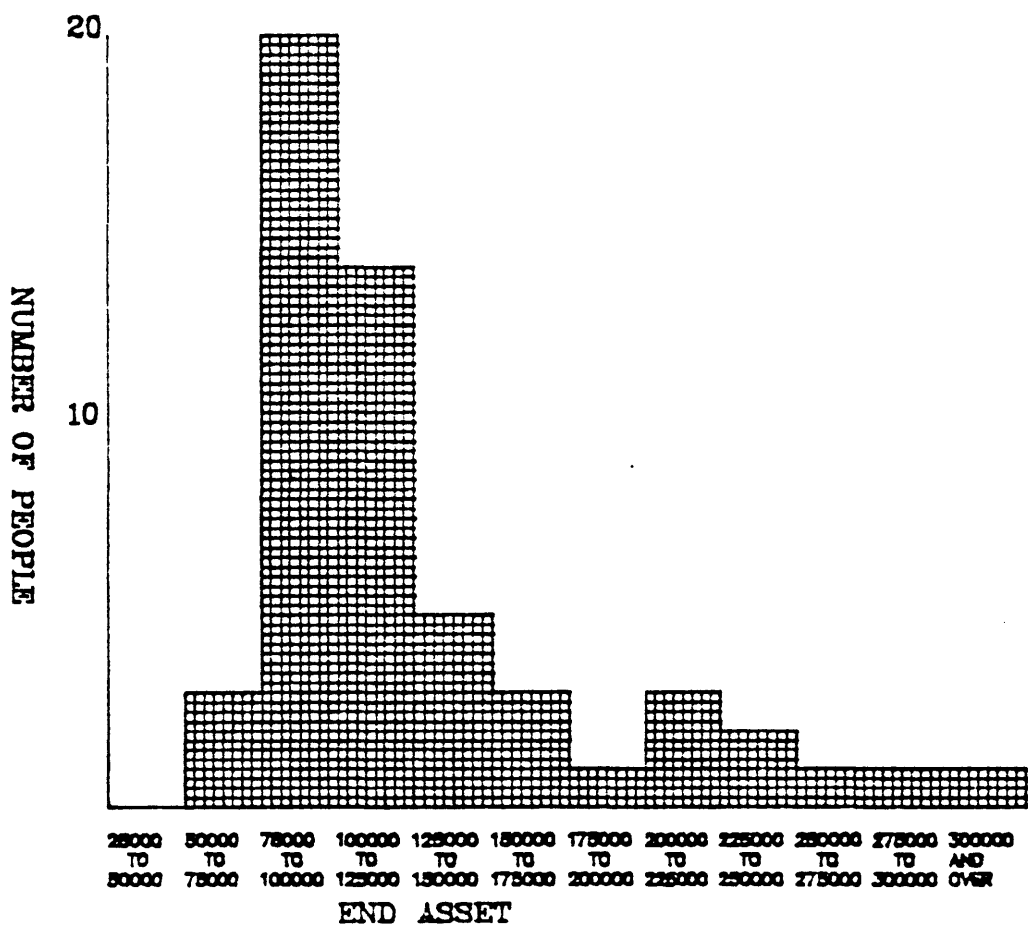
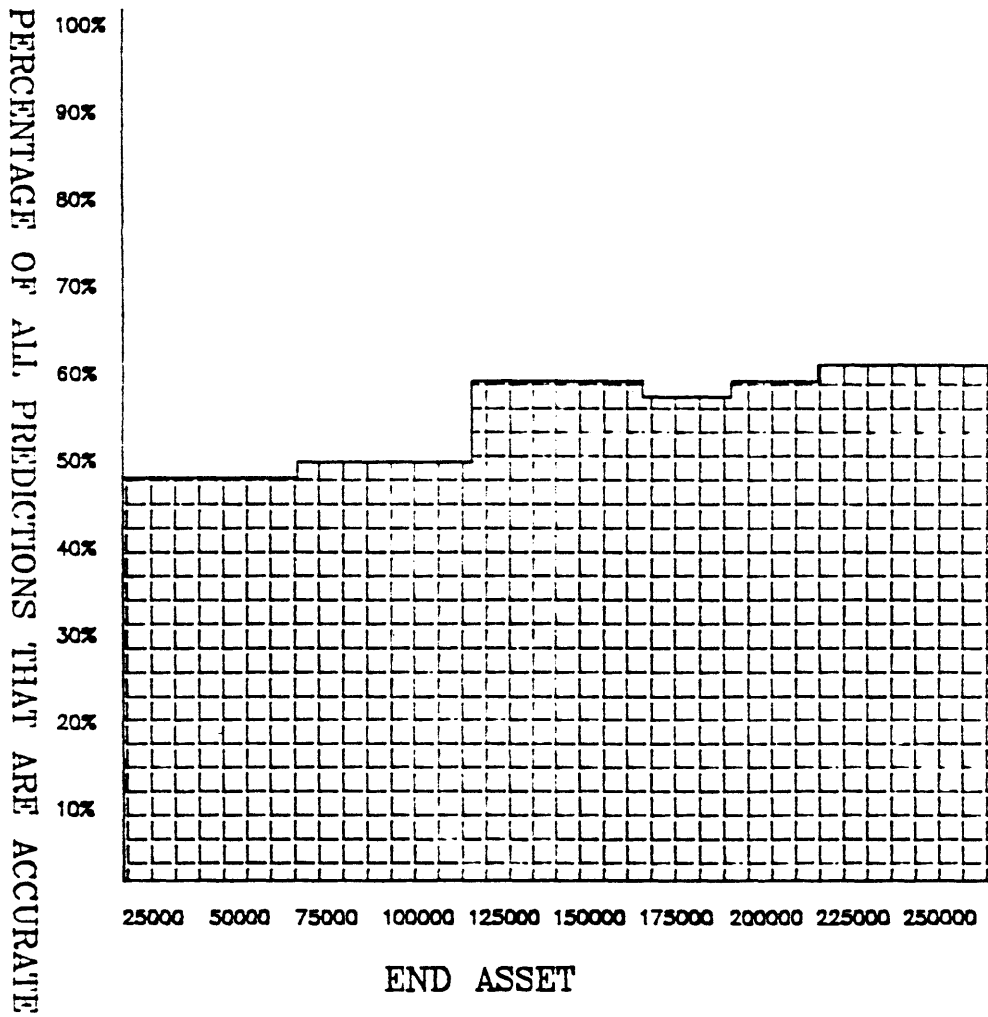


FIGURE 3

Percentage of the predictions (both selections and rejections)
accurate at each cut-off point; END ASSET predictor



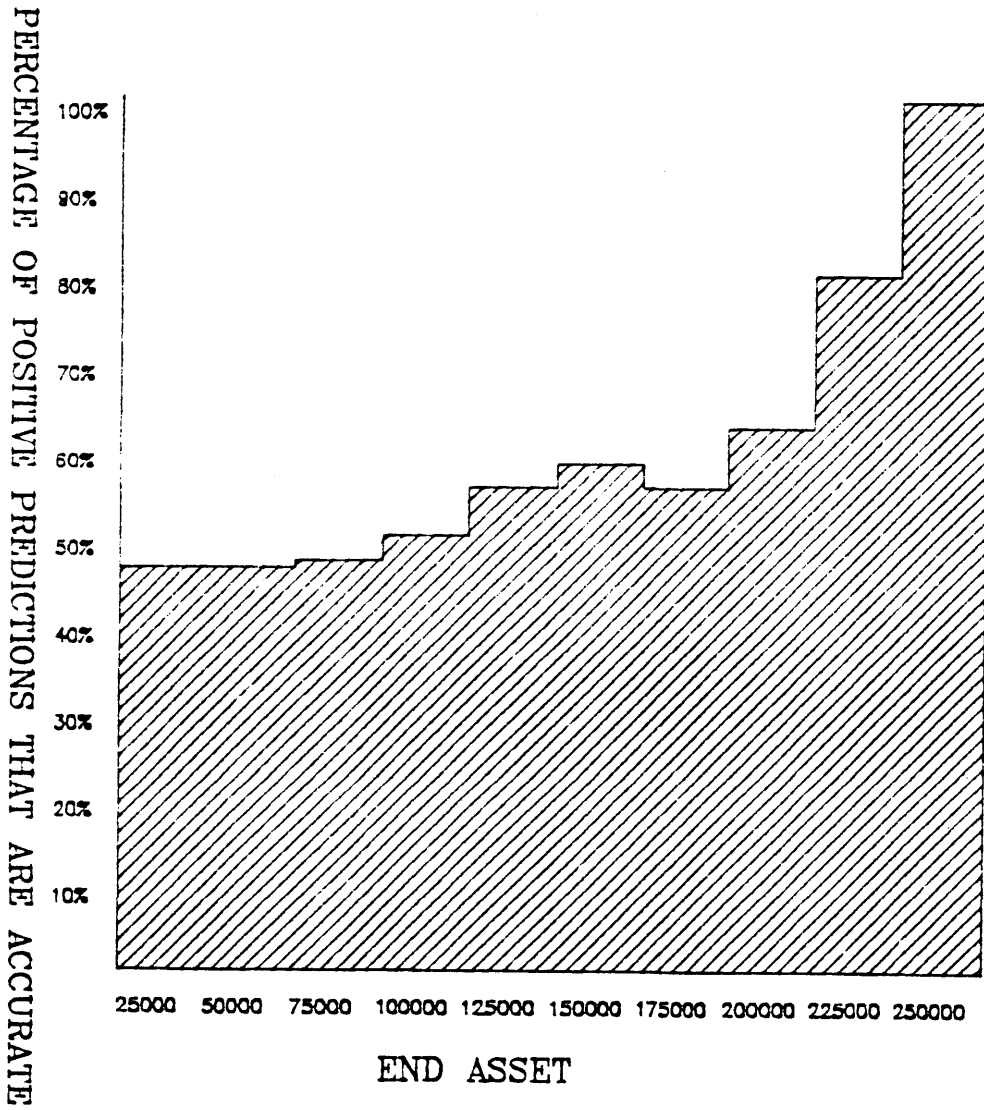
R125 000 or R150 000 seem to be possible cut off points. At these points 58,3 % accuracy is attained. It must be borne in mind that these percentages represent both accurate selections and accurate rejections.

When loan applicants are screened it is most important that accurate selections are made. Accurate rejections are of lesser importance. In other words it is important that potential successes are identified, but it is not so important that only failures are rejected. The next step was to examine the effectiveness of END ASSET in predicting success.

FIGURE 4 shows what percentage of the people at each-cut off point are successes according to the criterion.

FIGURE 4

Percentage of the predictions of success accurate at each cut-off
point: END ASSET predictor



It can be seen that selection accuracy reaches 60 % at a cut-off of R150 000. This rises to 80 % at R225 000. Very few people attain such high scores. The problem with such a high cut-off is that only about 10 % of testees would qualify. In addition an excessive number of potential successes would be rejected. A closer examination of the data revealed that almost all the "older" people in the sample (people over 45) were not scoring well on the game. The performance of the older players appeared to be unrelated to their business success. It was decided to exclude the older people (those over 45) from the sample and to analyse the relationship between business success and performance on the game in the reduced sample. A total of 12 people were removed from the sample. It can be argued that the "track record" of an older person is a more appropriate index of future business performance than scores on the game. TABLE 2 the mean, standard deviation, minimum and maximum scores on END ASSET in this reduced sample.

TABLE 2

Mean, standard deviation, minimum and maximum values of END ASSET; subjects under 45 years old

<u>VARIABLE</u>	<u>N</u>	<u>MEAN</u>	<u>S.D.</u>	<u>MIMIMUM</u>	<u>MAXIMUM</u>
END ASSET	37	134 511	58 190	72 350	309 400

FIGURE 5 and FIGURE 6 show the cut-off points on END ASSET when only persons under the age of 45 are included. In FIGURE 5 prediction accuracy reflects both correctly identified failures and correctly identified successes; in FIGURE 6 prediction accuracy reflects only correctly identified successes.

From FIGURE 5 it can be seen that an optimal prediction of successes and failures (approximately 65 % accuracy) is obtained at a cut-off of R125 000. Cut-offs lower than this value result in increased errors in the identification of successes, and cut offs higher than this value result in increased errors in the identification of failures.

FIGURE 5

Percentage of the predictions (both selections and rejections)
accurate at each cut-off point in the under 45 year old sample:
END ASSET predictor

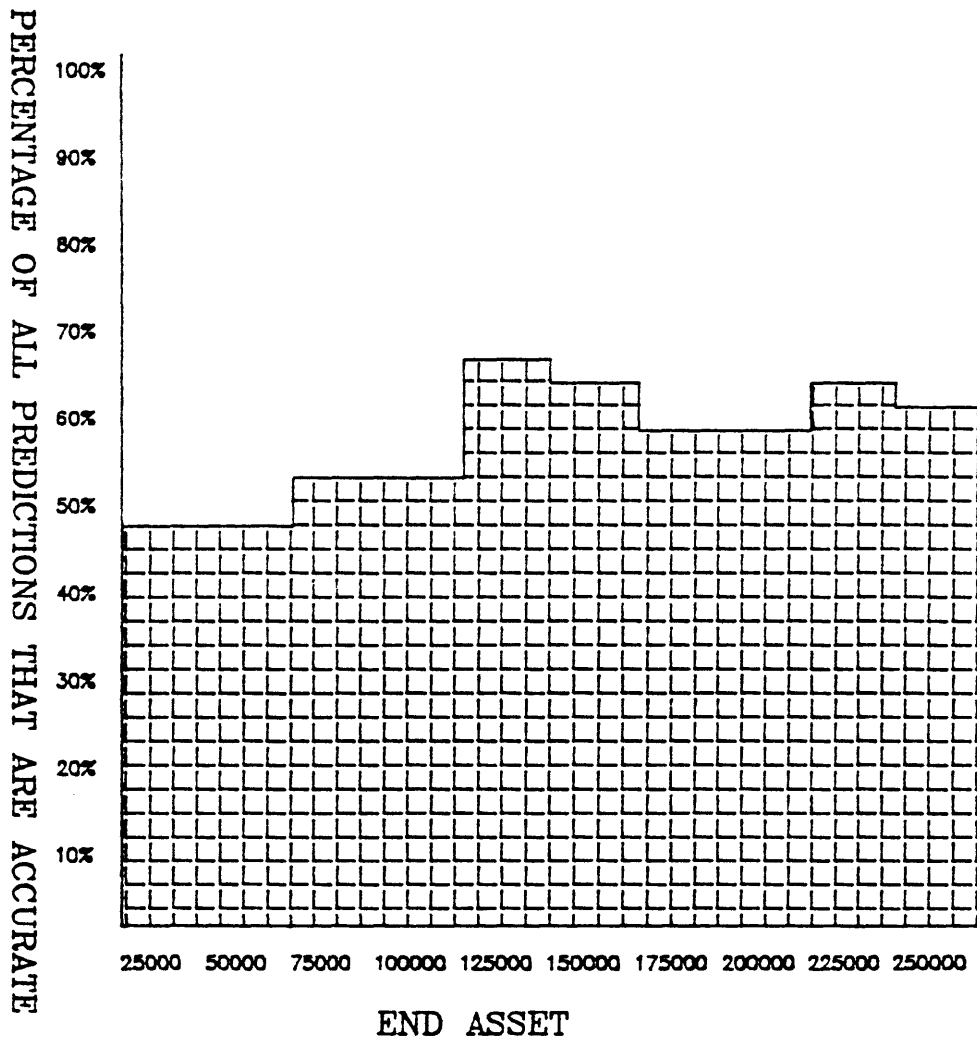
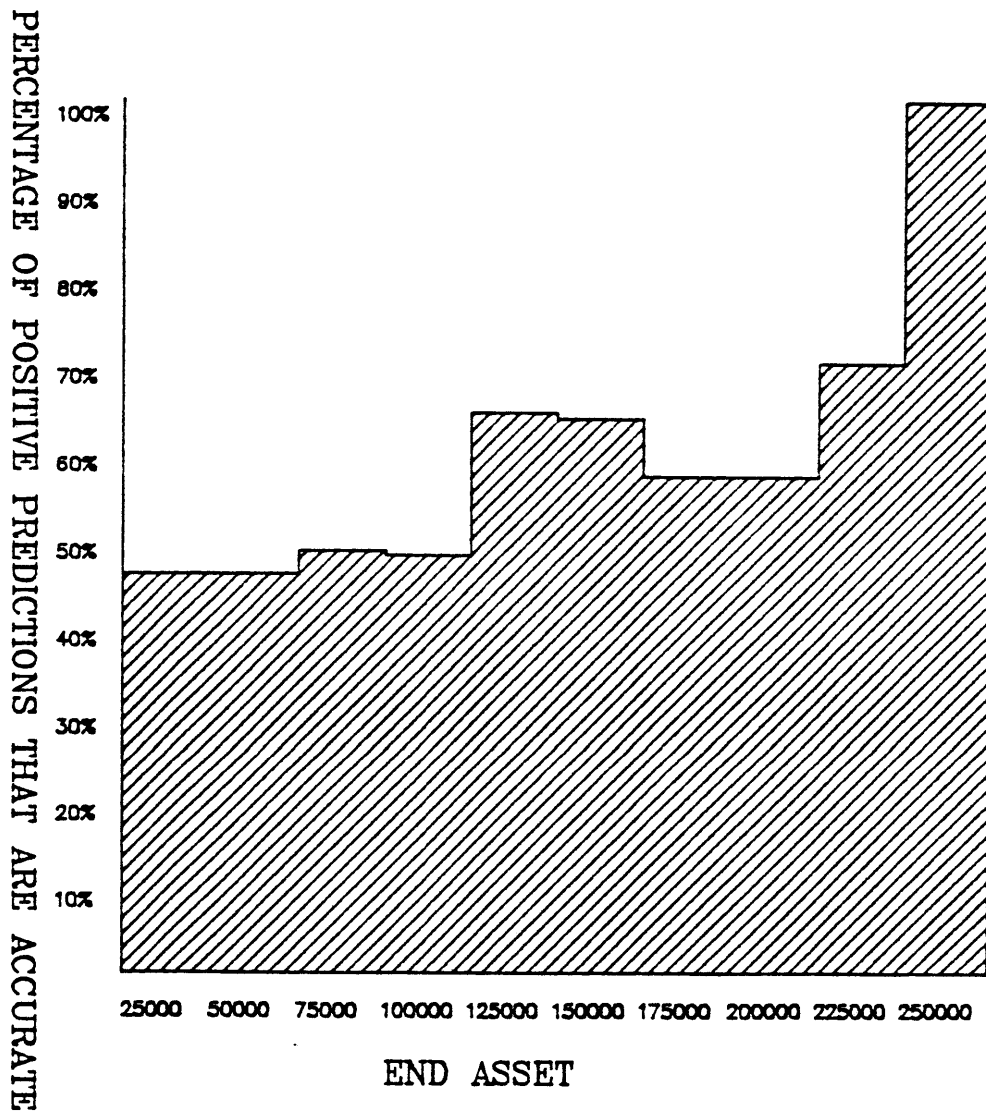


FIGURE 6

Percentage of the predictions of success accurate at each cut-off point in the under 45 year old group: END ASSET predictor



Inspection of FIGURE 6 reveals that at R125 000, the percentage of accurate selections achieved is in the vicinity of 65 % (the precise figure is 64,3 %). It is only at R225 000 that an accuracy level in excess of 70 % is achieved.

A total of six individuals were misclassified as successes by cutting the score on END ASSET at R125 000. An inspection of various aspects of these testees' play revealed that five of them behaved precipitously or impulsively at one point in the game when the player is permitted for the first time to sell shops, and to buy certain classes of shops. None of the individuals who were correctly identified as successes behaved in this way, although one of those rated as a failure according to this criterion did so.

It will be remembered from the discussion on the interviews that impulsivity was identified as a discriminating factor: Successful businessmen seldom seem to behave impulsively, whereas unsuccessful ones apparently do. It appears that a player can "get away with" impulsive behaviour in the game with fewer consequences than would occur in real life. Fortunately, the game provides an index of impulsivity (that mentioned above). Precipitously buying and selling shops appears to be a negative indication of the individual's prospects of success and can be used, in addition to END ASSET, in making judgements of his

performance. FIGURE 7 shows the accuracy of prediction of success and failure with the six impulsive individuals taken as failures at all cut-off points.

At the R125 000 cut-off 71 % are correctly classified as successes or failures. The reason why higher cut-off points are inferior is because at each higher point more and more successes are rejected. As mentioned earlier in this application, accurate identification of potential successes is more important than accurate identification of failures.

FIGURE 7

Percentage of the predictions (both selections and rejections)
accurate at each END ASSET cut-off point in the under 45 year old
sample (impulsive testees are rejected)

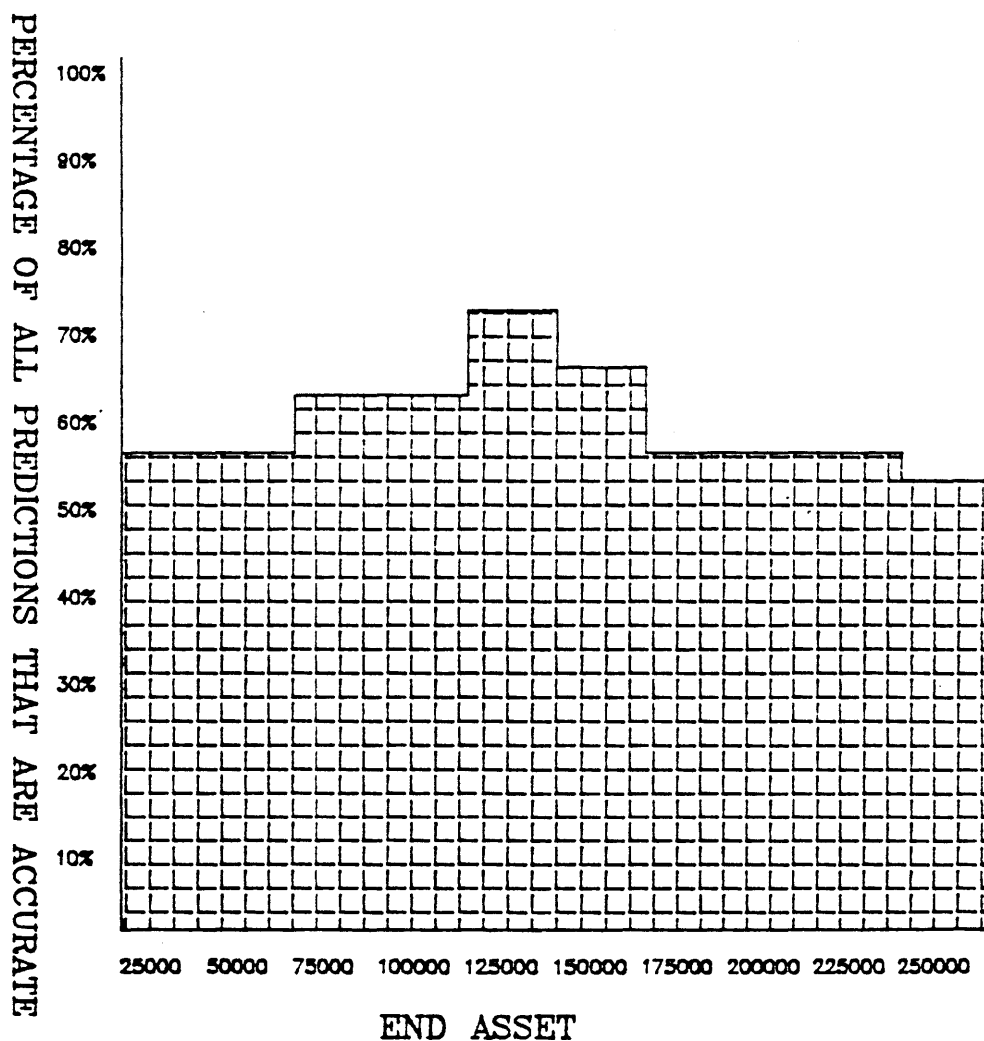


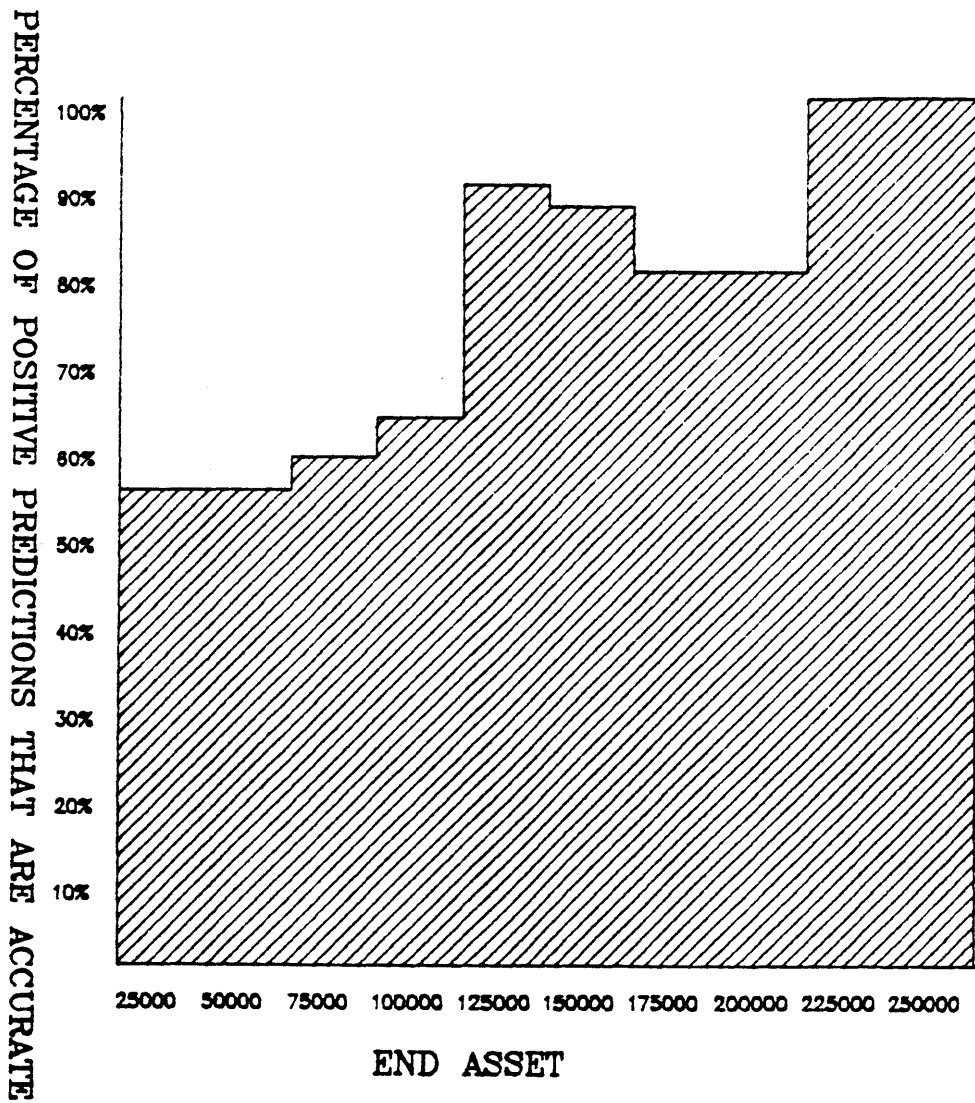
FIGURE 8 shows the percentage of accurate selection decisions that are made at each of the cut-off points.

R125 000 is clearly the best practical cut-off point, with 90 % accuracy achieved. Hence with the combination of END ASSET and the simple impulsivity measure, successful individuals could be identified with 90 % accuracy at R125 000, the selection ratio is about 1:4. If the sample tested for the validation is taken as totally representative of the population that will apply for loans, this means that at this cut-off point 25 % of applicants will be selected.

Interestingly, Andrews (1986) quotes highly similar figures. Referring to businesses that have just started he quotes the "2/6/2 syndrome": In every ten ventures 2 will be outright failures, 6 will become "living dead" or "survivors", and 2 will be "winners".

FIGURE 8

Percentage of the predictions of success accurate at each END ASSET cut-off point in the under 45 year old sample (impulsive testees are rejected)



5 CHANGES MADE TO THE GAME

The most important improvements to the game were intended to decrease the number of errors the test administrators can make. The answer sheets were made less compact, and test administrators are now required to record more information on each transaction. The recording of all the relevant variables during each transaction will make it less likely that relevant information will be omitted from calculations.

While the version of the game used for the validation required the administrator to take stock (count money, produce, shops, etc.) once a "year", the new version requires this to be done every "six months". Although this change will not eliminate errors, it will facilitate the detection (and early correction) of errors, if the test data are checked at some later stage.

The testees' booklet as well as the administrators' booklet were also changed. The transactions that the testee may make during each month are presented in a fixed sequence. In the previous versions of the booklets the transactions were not presented in a fixed order. The lists in the administrators' booklet that indicate how much the testee is to be paid out every month were improved.

The overall length of the game was reduced from 2 years and four months to two years. This was done by eliminating months during which relatively little happened. The revised game is more "fast moving", and no "boring" months occur. As a further bonus, the time required for administration is reduced.

6 CONCLUSION

The business game proved to be a successful instrument for the identification of entrepreneurial potential. Although this approach was not compared with a more conventional approach (involving, for instance, questionnaire-type instruments), it seems unlikely that less business-relevant measures would have been more successful. In the simulation "real behaviour" was assessed rather than reported behaviour, which is prone to falsification and other problems.

Although it was argued that an END ASSET score of R125 000 should be used as a cut-off point, the final decision resides with the Urban Foundation. At higher cut-off points fewer individuals will qualify for loans and the risk taken by the Urban Foundation will be smaller; however, large numbers of potentially successful applicants will be turned away. Conversely, at lower cut-off points, more applicants will qualify for loans, and the risk taken by the Urban Foundation will be greater, but fewer deserving individuals will be refused loans. It is clear from

FIGURE 2 that most testees score below R125 000 on END ASSET. FIGURE 8 indicated that at this cut-off (given that impulsive testees are also rejected) 90% of accepted cases would be successes. If, on the other hand, the Urban Foundation decides to reject a loan applicant only if it is clear that the individual has almost no potential, then a cut-off on END ASSET of about R100 000 would be more appropriate. A cut-off at R125 000 has the advantage that, overall, the fewest errors are made (the total of "false negatives" and "false positives" is minimized).

The cut-off on END ASSET of R125 000 is based on data which have been corrected for errors. It will not be possible for counsellors in the field to make adjustments for errors since they will not have access to the resources employed during the validation exercise. The improvements to the administrators' sheet and to the game booklets should help to reduce the frequency of errors. The most effective way to reduce this problem, however, is to ensure that only thoroughly competent and conscientious individuals are permitted to administer the game. During later administrations in the validation exercise, administrators made no errors; this illustrates the importance of practice.

On two occasions during the game the testee is offered the opportunity to take out a loan. The repayment of the first of these loans falls due just before the end of the game. It may be

in the interest of the counsellors to regard anybody who defaults on this activity with extreme suspicion, especially since the Urban Foundation wishes to select entrepreneurs who are likely to repay their loans. It was impossible to investigate the relation between the repayment of loans in the game and actual repayments of loans, because the sample tested for the validation did not consist of loan applicants.

The effective use of information cards is to a large extent reflected in the END ASSET of the testee. The relation between success and which information cards were read and kept, was not investigated in this study. It would not be reasonable to expect the administrator to make additional decisions about the characteristics of the players behaviour during the game. This could however be thoroughly investigated in the future if the game is computerized.

7 REFERENCES

- Andrews, A. (1986.) Development needs venture capital and entrepreneurs. Human Resource Management, Vol 2 No 6, June 1986.
- Jooste, C. (1986.) Die behoefte aan entrepreneurs in die R.S.A. Vrystaatse Onderwysnuus, No. 35. Aug 1986.
- Kanter, R. M. (1986.) The new workforce meets the changing workplace: Strains, dilemmas, and contradictions in attempts to implement participative and entrepreneurial management. Human Resource Management, 25, 4.
- Kaplan, R. (1987.) The antimanagement bias. Harvard Business Review, 87, 3.
- Kets de Vries, M. F. R. (1985.) The dark side of entrepreneurship. Harvard Business Review, 85, 6.
- MacMillan, I. C. (1983.) Growing concerns: Topics of particular interest to owners and managers of small businesses. Harvard Business Review, 83, 6.
- Pinchot, G. (1985.) Intrapreneuring: Why you don't have to leave the corporation to become an entrepreneur Harper & Row, Publishers, New York.
- Pottas, C. D. (1983.) Identifisering van entrepreneurskaptalent. Voordrag: Dosenteontwikkelingsprogram vir Suider-Afrika, Potchefstroom.

- Pottas, C. D. (1985.) Opleiding vir finansiële verantwoordbare prestasie deur entrepreneurs. Voordrag: SAVOO Nasionale Konvensie, RAU, Johannesburg, 2 Julie 1985.
- Pottas, C. D. (1986.) Opleiding van entrepreneurs is ingewikkeld maar nodig. Human Resource Management, January 1986.
- Reich, R. B. (1987.) The team as hero. Harvard Business Review, 87, 3.
- Schuler, R. S. (1986.) Fostering and facilitating entrepreneurship in organizations: Implications for organization structure and human resource management practices. Human Resource Management, 25, 4. Winter 1986.
- Smuts, M. (1986.) The growth of black business in South Africa. In R. Smollan (Ed.), Black advancement. Macmillan, South Africa Publishers (Pty).
- Stevenson, H. H. & Gumpert, D. E. (1985.) The heart of entrepreneurship. Harvard Business Review March - April

HSRC PUBLICATION LIST

A complete list of HSRC publications or a list of publications of a particular Institute of the HSRC is available from the Head: Technical Services

1111 - 170030

1111 - 16 - 5076

Copy no. PR-17202

HUMAN SCIENCES RESEARCH COUNCIL RAAD VIR GEESTESWETENSKAPLIKE NAVORSING

President	Dr J.G. Garbers	President
Deputy Presidents	Dr H.C. Marais, Dr J.D. Venter	Adjunk-presidente
Vice-Presidents	Dr K.F. Mauer, Prof. D.J. Stoker	Vise-presidente
Executive Director: Administration	J.G.G. Gräbe	Uitvoerende Direkteur: Administrasie
Chief PRO	Dr G. Puth	Skakelhoof

Functions of the HSRC

The HSRC undertakes, promotes, supports and co-ordinates research in the field of the human sciences. It also determines research priorities, disseminates the findings of human sciences research, facilitates and evaluates the implementation of research findings, stimulates the training of researchers, places the full spectrum of human sciences disciplines at the service of the inhabitants of the RSA and promotes science in general.

Institutes

Institute for Communication Research (ICOMM)
Institute for Educational Research (IER)
Institute for Historical Research (IHR)
Institute for Manpower Research (IMAN)
National Institute for Personnel Research (NIPR)
Institute for Psychological and Edumetric Research (IPER)
Institute for Research Development (IRD)
Institute for Research into Language and The Arts (IRLA)
Institute for Sociological and Demographic Research (ISODEM)
Institute for Statistical Research (ISR)
Bureau for Research Support Services (BRSS)
Administration

Head office

Private Bag X41, Pretoria 0001
Republic of South Africa
Telegrams RAGEN
Tel. (012) 202-9111
Telex 3-20893 SA

NIPR

P.O. Box 32410, Braamfontein 2017
Republic of South Africa
Telegrams NAVORSPERS
Tel. (011) 339-4451
Telex 4-25459 SA

Regional offices

Western Cape, Private Bag X5, Roggebaai 8012
Tel. (021) 419-2572/3/4/5 Telex 5-22260 SA
Natal, P.O. Box 17302, Congella 4013
Tel. (031) 815970 Telex 6-28567 SA
NIPR Eastern Cape, P.O. Box 1124, Port Elizabeth 6000
Tel. (041) 53-2131 Telex 2-43203 SA

Funksies van die RGN

Die RGN onderneem, bevorder, ondersteun en koördineer navorsing op die gebied van die geesteswetenskappe, bepaal navorsingsprioriteite, versprei die resultate van geesteswetenskaplike navorsing, vergemaklik en evalueer die implementering van die resultate van navorsing, stimuleer die opleiding van navorsers, stel die volle spektrum van dissiplines in die geesteswetenskappe ten diens van die inwoners van die RSA en bevorder die wetenskap in die breë.

Instituute

Instituut vir Geskiedenisnavorsing (IGN)
Instituut vir Kommunikasienavorsing (IKOMM)
Instituut vir Mannekragnavorsing (IMAN)
Instituut vir Navorsingsontwikkeling (INO)
Instituut vir Opvoedkundige Navorsing (ION)
Nasionale Instituut vir Personeelnavorsing (NIPN)
Instituut vir Psigologiese en Edumetriese Navorsing (IPEN)
Instituut vir Sosiologiese en Demografiese Navorsing (ISODEM)
Instituut vir Statistiese Navorsing (ISN)
Instituut vir Taal- en Kunstenavorsing (INTAK)
Buro vir Ondersteunende Navorsingsdienste (BOND)
Administrasie

Hoofkantoor

Privaatsak X41, Pretoria 0001
Republiek van Suid-Afrika
Telegramme RAGEN
Tel. (012) 202-9111
Teleks 3-20893 SA

NIPN

Posbus 32410, Braamfontein 2017
Republiek van Suid-Afrika
Telegramme NAVORSPERS
Tel. (011) 339-4451
Teleks 4-25459 SA

Strekkantore

Wes-Kaap, Privaatsak X5, Roggebaai 8012
Tel. (021) 419-2572/3/4/5 Teleks 5-22260 SA
Natal, Posbus 17302, Congella 4013
Tel. (031) 815970 Teleks 6-28567 SA
NIPN Oos-Kaap, Posbus 1124, Port Elizabeth 6000
Tel. (041) 53-2131 Teleks 2-43203 SA

ISBN 0 7969 0537 1