A SURVEY OF MICROCOMPUTER OWNERSHIP AND USAGE*

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In this paper we present the results of a survey designed to collect information on the use of microcomputers and attitudes towards them. The survey was conducted by mail in the north-eastern part of New South Wales and based on a mailing list used by the Department of Continuing Education at the University of New England for courses related to computers. It suggested that microcomputer use is largely related to business applications and not to personal income levels. A surprising degree of satisfaction with the systems was observed.

Keywords: microcomputers, computer use, diffusion

INTRODUCTION

This paper reports in detail the findings of a survey of the ownership and use of microcomputers and, more generally, of the attitudes towards microcomputers expressed by both owners and non-owners. On the potential utility and economic prospects for microcomputers, there has already been a plethora of surmise, debate, promotion activity and anguished sermonising, some of it well informed, much of it not. In Australia in particular, however, it has been difficult to find much hard evidence at all about what is actually going on.[1] Our survey is an attempt, albeit limited in scope, to try to establish a few facts. We shall attempt little formal analysis of the data in this paper; even so, it will be possible to gain a number of insights into the way in which this element of information technology is diffusing.

For researchers working on the spread of information technology, the microcomputer is of particular interest as a focus of analysis since it brings with it the potential (lacking in such consumer durables as the video cassette recorder) for introducing its owner to the 'wired society'. Those who can confidently exploit its possible uses will be ready to collect, store, manipulate and transmit information for business and domestic purposes as the relevant infrastructure and support services are introduced.

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With the advent of Austpac, Viatel, Telememo and Teletex (all Telecom services) by or in 1985, it is clear that important parts of the foundation for the wired society in Australia have already been laid in the public sector. The private sector is playing its part through information provision and by providing most of the computer hardware and software. This survey was conducted in May 1984, when Viatel, Telememo and Teletex had neither been introduced nor widely publicised. The better-informed and enthusiastic would, however, have known that these services were imminent.

In all, 850 questionnaires were sent out. The mailing list was provided by the Department of Continuing Education at the University of New England. The department runs courses on a wide range of subjects, including BASIC and other aspects of computing. Those on the list were known by the department to have expressed an interest in computers or computing and many of them had taken a computing-related course through the department. By definition, the selection of this group was not random. Rather, we set ourselves the task of investigating a group whose members at least knew about and were, in principle, interested in information technology. This must be borne in mind throughout, but should not be regarded wholly as a disadvantage. We have been able to develop a picture of the characteristics of owners and users, and to discover the reasons why non-owners have not yet purchased. Moreover, we can report feedback from users, whether owners or not, and we can present a picture of how this interest in microcomputers has developed over time. We received just over 200 responses.

CHARACTERISTICS OF SURVEY RESPONDENTS

While the questionnaire was sent to some people who may not have taken computer-related courses through the Department of Continuing Education, all but 19 respondents indicated that they had, at some time, enrolled in at least one such course, often with another educational institution. (As is apparent from the 'No reply' category in Table 13 — which has 24 entries — a slightly larger number simply did not report when they first became interested in such courses.) We are thus able to characterise a group which has as its focus an interest in learning about computers. Each of the variables in the tables of characteristics has a distribution far different from both that of the population as a whole and that of household heads in Australia. Learning about computers seems to be of greatest interest to male professional people who are also middle-aged, on reasonable incomes, and engaged in activities in which collecting, storing and manipulating information is important.

That said, a detailed examination of the respondents' characteristics reveals the following features:

1. Age

A low representation of school children in the group arises from the policy of the Department of Continuing Education not to cater for school children. The paucity of 19 to 29 year-olds is harder to explain. Perhaps this age group is too busy establishing itself in careers to notice or wish to engage in Department of Continuing Education activities.

2. Income

The proportion of incomes under $20,000 is perhaps exaggerated by the large number of farmers in the surveyed group. Twelve of the 41 farmers reported very low incomes, some with the comment that income varied substantially over time. (For estimates here we relied upon respondents themselves to assess their household income. In performing this task, farmers may not have taken account of non-farm income.)

3. Educational attainment

The peculiarity here is that a third of respondents had only high school education. This reflects the small business and rural biases of the group of respondents. It also suggests that post-school technical education has not been as widespread as might have been expected for people engaged largely in small business, farm and non-farm.

4. Occupation and activity

While our codings leave something to be desired, we think they show clearly that interest in computers is principally confined to those whose occupational activity is information production, distribution, manipulation and use. Only 22 respondents (11 per cent of the total) were probably not engaged in these activites. Only 7 of these 22 were, in fact, remote from information activity, as indicated by their responses to other questions. Are the information rich trying to get richer, while the information poor remain unconcerned?

TABLE 1

Age of the Surveyed Respondents

Age Group	Number	Percentage
18 and under	4	2.0
19 to 29	19	9.3
30 to 39	72	35.3
40 to 49	65	31.9
50 to 59	29	14.2
60 and over	15	7.4

TABLE 2

Annual Household Income of Survey Respondents

Income Range $ 000	Number	Percentage	
		Total	Reporting
1 to 20	53	26.0	28.2
21 to 30	61	29.9	32.4
31 to 40	36	17.6	19.1
41 to 50	17	8.3	9.0
51 to 98	12	5.9	6.4
Over 99	9	4.5	4.8
No income reported	16	7.8	—
Total	204	100.0	100.0

TABLE 3

Sex of Surveyed Respondents

Category	Number	Percentage
Male	150	73.5
Female	54	26.5

TABLE 4

Educational Attainment of Surveyed Respondents

Education level	Number	Percentage
High school only	64	31.7
Technical college	39	19.3
CAE or university	76	37.6
Higher degree	14	6.9
Other	9	4.5
Total	202	100.0

Note: 2 respondents did not answer this question.

TABLE 5

Occupation, Trade or Profession of Surveyed Respondents

Occupation category	Number	Percentage
Medical, veterinary and related	19	9.3
Non-medical scientists	11	5.4
Technician or engineers	20	9.8
Teacher	23	11.3
Other education & social service	10	4.9
Business service professions	12	5.9
General administrative trades and professions	30	14.7
Sales occupations	12	5.9
Tradesmen and women	6	2.9
Farmers	39	19.1
Other agricultural & environmental occupations	6	2.9
Home duties	10	4.9
Other	6	2.9
Total	204	100.0

TABLE 6

Activity of Surveyed Respondents

Activity category	Number	Percentage
Farm manager	41	20.1
Non-farm business manager	61	29.9
Research and design	12	5.9
Consulting and extension	5	2.5
Education	28	13.7
Clerical activities	21	10.3
Medical and para-medical services	14	6.9
Production of physical goods	5	2.5
Other	17	8.3
Total	204	100.0

EXPERIENCE OF, AND INTEREST IN, COMPUTERS

Only a proportion of the respondents had actually enrolled in a computer course with the Department of Continuing Education, but as already noted, some had enrolled (instead or in addition) in courses elsewhere, in some cases before the department's courses were first offered. One or two respondents first enrolled in a computer course in the late 1960s. But it was not until the late 1970s that significant numbers enrolled for the first time, while 1982 and 1983 were the peak years, with 49 and 73 enrolments respectively. Eighty respondents regularly purchase a computer magazine, with 37 buying one, 22 two, and 13 three. Twenty-six were members of a computer-users' club.

Respondents' first major source of information about computers was spread across the possibilities specified in Table 7. Friends' or children's schools were (surprisingly) unimportant, while respondents' own contact with an educational institution was remarkably prominent. It may be that course advertisement by the Department of Continuing Education was itself the reason for this. Public media were also more important than we expected. Once microcomputers are an established item of business and household equipment we might expect peer influence to be greater.

TABLE 7

First Source of Information About Computers for Surveyed Respondents

Source	Number	Percentage
School, TAFE college, CAE or university	61	31.6
School, etc, in which friends or children were enrolled	8	4.1
Newspapers, television, trade magazines	50	25.9
Colleagues or other firms in same line of business	27	14.0
Family members, friends or neighbours	21	10.9
Other	26	13.5
Total	193	100.0

Note: 11 respondents did not answer this question.

Ownership and usage of computers are the other major elements which distinguish members of our group. Amongst respondents who were owners, the only statistically-significant demographic characteristic which distinguished them from the non-owners was sex (Table 8).

TABLE 8

Ownership by Sex

Ownership status	Male	Female	Total
Owners	93	21	114
Non-owners	41	26	67
Total	134	47	181

Note: 23 respondents who answered questions elsewhere on the questionnaire offered no reply here.

The motivation to own a computer derives, broadly, from two sources. On the one hand, a computer system is viewed as an investment good to meet business needs; on the other hand, it is viewed as a consumer durable for general use within the household. Systems located in the homes of businessmen may serve both sets of purposes, whether their business is run from home or not. In all, 75 computer-owners said they used their computer at home. Of these, 26 ranked business as the principal use to which the computer was put, while 10 others admitted putting their system to some business use. This left 39 home owner-users for whom business played no part in motivating ownership. This sub-group differed in its characteristics only minimally from respondents overall, but contained a relatively high proportion of educationists and the highly educated. They did not, in general, spend as much on their hardware and software as business home-users, but were rather more likely to buy magazines or belong to clubs. Only seven owners claimed to use their computer for household management purposes.

Non-owners and non-users are not quite the same group. We first examine the intersection of these sets to see whether it is distinguished by any peculiarities. Of the 44 members of the non-owner/non-user sub-set, 18 were women, an over-representation relative to all respondents. The other major feature of this group is its members' strong indication of doubt or uncertainty about the value to them of microcomputers. No less than 26 of the 44 were waiting to discover

"something useful and/or stimulating which a computer could do" for them, before considering purchase. A number of members of this group retained an interest in microcomputers nonetheless. Twenty-four were interested in purchasing a microcomputer. Table 9 shows the distribution of their price expectations, and contrasts this with that of prices paid by owners. It might be noted here that only one of these intending purchasers expected to buy a very cheap computer (less than $500), whereas nearly a quarter of actual purchasers had bought in this price range. Of those not presently intending to purchase, seventeen were waiting for price to fall (3) or their income to rise (4), or were "still saving up" (10).

TABLE 9

Actual and Expected Prices of Microcomputers

Price range	Purchasers	Intending purchasers
Under $500	24	1
$500 to $2499	38	10
$2500 to $5999	26	8
$6000 and over	19	5
Total	107	24

There were 23 non-owner users amongst the group of respondents. Again, women were over-represented, this time because they tended to be operators of word processors and business computing systems in clerical positions. Farmers and business managers were under-represented, whilst professional and clerical people were over-represented. A majority of non-owner users (56 per cent) had access to microcomputers; the rest used minicomputers and mainframe computers. Over half (13) had no desire to own a microcomputer. Ten of these users could not think of any use or pleasure from ownership. On average, non-owner users had enrolled in a computer course rather earlier than was the case for all respondents taken as a group, but they were less interested in computer magazines or user clubs than owners (see Tables 16 and 17). Clearly this is a group whose interest in microcomputers is unrelated to the household consumer durable aspect of microcomputer demand. We believe computer marketers are likely to encounter substantial informed resistance to computer purchase among this group.

Our picture of the respondents is, thus, of a number of sub-groups, each with its own characteristics. Professional and business people appear to own and use microcomputers in relation to the requirements of their own work. Among non-owner users there appeared to be a significant element of continuing resistance to the notion of home computer ownership — despite (and, we surmise, perhaps even because of) familiarity with computers and computing. Owners who use their systems at home can be seen as consumer innovators, chancing their funds on something which might be useful or stimulating. They tend to be more highly educated or involved in education.

USAGE OF MICROCOMPUTERS

Respondents were asked, first, to rank the three main uses to which they put their computers. The results for the group as a whole and for those who made use of their computer at home are shown in Table 10. As is clear, business use scored most heavily in terms of primary use overall, and was important even when home users only were considered. Primary business usage is, however, associated with other (i.e. non-primary) usage. Only in 22 of the 88 cases was there no other use. Of the 66 remaining cases, the main non-primary use was 'learning about computers' (39 cases), followed by 'other education: children' (22), 'research' (15) and 'recreation' (14).[2]

TABLE 10

Ranking of Major Computer Uses by Survey Repsondents

Ranking of use	All respondent users (142)		Home users (75)	
	Use	Score	Use	Score
Primary	Business	69	Learning about computers	28
	Learning about computers	45	Business	26
	Recreation	8	Recreation	7
Secondary	Learning about computers	28	Other education: children	22
	Other education: children	27	Learning about computers	17
	Other education: self	15	Recreation	8
Tertiary	Recreation	22	Recreation	16
	Other education: children	20	Other education: children	13
	Other education: self	14	Other education: self	8

For home users, 'business' and 'learning about computers' were about equally important. Apart from this, the patterns of usage were

not greatly different from those of the whole group of respondents. It is notable that recreational use of computers does not score highly, perhaps because some respondents were shy to admit to their course instructor that they played games, or perhaps because their genuinely serious concern to learn about computers was reflected in a distaste for what they perceived as triviality. Most came to courses with a business orientation. Nonetheless, recreational use is reported in a substantial number of cases, being the first or second use for 15 respondents. Home management is, as yet, a very insignificant use for home computers.

Business usage of microcomputers was investigated by a series of questions to business people, including farmers. Nineteen of the 41 farm managers were computer users, while 69 of the non-farm business people (about 115 respondents) used their computer for business at least some of the time. Thus a rather smaller proportion of the farmers than of other business people in our survey were business users. All users were asked if they had potential uses for the computer which were beyond their reach because of cost or availability. Just over half said they had, and that availability of hardware or software was more often the problem than cost.

Farmers face a number of special demands and difficulties in the use of computers; problems of distance from help with the use of such machines, difficulty in collecting data to enter into a computer, dislike of office-type work, unreliable power supplies and a limited range of suitably-adapted software. On the other hand, farmers survive by adopting new technology and have used this as a means of maintaining profitability. They need frequent and recent market information, and this information must often be transmitted over long distances.[3] They are also accustomed to making such technology work. It was, therefore, of particular interest to investigate the patterns of use of microcomputers by the farmers in the study group.

Farm users were asked how often they used computer records of various kinds. Table 11 summarises their responses. The table indicates that computer use is probably routine in at least half of the farms which use a computer at all for business. It should be noted that frequency of use of the machines has little to do with economic benefits gained. A high frequency of use is likely to be related to the nature of the records kept and the ease of use of the software.

Of the 41 farm users of microcomputers, 24 per cent indicated that they had uses for computers which were not possible because of a lack of software. A larger proportion gave no reply or said they had no uses needing software. This would seem to confirm a pattern, seen throughout the survey, of people with a relatively poor understanding of what is possible with microcomputers and experimenting with the new technology to see where it might apply in their circumstances.

TABLE 11

Type of Records Kept and Frequency of Use for Farm Users

Type of record	Frequency of use			
	Daily	Weekly	Monthly	Yearly
Farm accounts and budgets	2	8	3	3
Herd and flock records	—	5	1	—
Paddock records	—	3	3	—
Crop production records	—	2	3	1
Other	—	4	1	1

Note: 16 respondents replied to these questions. Of these, one was a hobby farmer and another did clerical duties as a farmer's wife.

For the same group of farm users, a question was posed about the frequency of use of their computers for the keeping of farm records. Few users specified regular use of their machines. The most common frequency mentioned was weekly; a smaller number indicated monthly use. It was expected that regular employment of the machine for farm accounts and budgets would be typical, but again only 34 per cent indicated such use. Some 17 per cent used their machines for herd or flock records, 19 per cent for paddock records and 19 per cent for crop production or yield records.

For those farm computer users who had not used their machines for help in making decisions, a question was asked about the decisions for which they might find a computer helpful. Of the 10 people who said they had not used their machines for help in decision making, all indicated they would find a machine helpful for business-type decisions. This suggests that farm users generally perceive the microcomputer as assisting with business decisions.

As a number of firms are currently establishing public networks for the supply of agricultural information, a question was asked relating to their use. Only one of the 41 farm users indicated a public network had been used and two indicated they would like to be able to access such networks. This result would seem to indicate that there is much work yet to be done informing farmers about the nature of networks, how they can be used and what they might be used for in farming.

Non-farm business users (69 respondents) were asked to specify the type and frequency of use of various business records kept on

computer. Table 12 shows the response. It seems clear that members of this group use their computers rather more intensively than do farm users. Three respondents in fact used all four types of records daily. Five respondents used a public network of some kind, and 16 wished to do so when one became available, but as with farmers, few were aware of specific services currently or imminently available. Nonetheless, the level of general awareness of the concept appeared to be rather higher amongst non-farm business users than amongst farm computer-users.

TABLE 12

Type of records Kept and Frequency of Use for Non-Farm Business Users

Type of record	Frequency of use			
	Daily	Weekly	Monthly	Yearly
Sales records	10	4	5	—
Business accounts	14	6	8	1
Stock control, inventory	9	6	2	2
Other	10	4	5	2

Note: 52 respondents replied to these questions.

LEVELS AND TRENDS IN OWNERSHIP, INTEREST AND SATISFACTION

Table 13 indicates when interest was first shown in enrolling in a computer course, in buying a computer and in actually purchasing. (As is apparent from a comparison with Table 8, however, not all owners answered the questions relating to year of first wanting to purchase and year of purchase itself. Furthermore, as noted earlier, not all respondents who said they had enrolled for courses answered the question relating to their year of first interest in enrolling.) It can be seen that first interest in enrolment in computer courses precedes first interest in buying a computer. Interest in computer courses rose sharply over the four years 1980-1983, but by 1984 was apparently in decline. (Questionnaires were sent in May and it seems most unlikely that interest would have increased six-fold by the end of the year.) This may be because it is perceived that less formal training will be required in future to operate microcomputers as manufacturers make systems more user-friendly.

TABLE 13

Year of First Purchase, Year of First Wanting to Purchase and Year First Interested in Enrolling in a Computer Related Course

Year	Number of respondents		
	Purchase machine	Wanting to purchase	Interest in enrolling
1956	—	1	—
1968	1[a]	1	2
1969	—	—	1
1970-79	4	12	11
1980	3	12	14
1981	8	14	18
1982	27	37	49
1983	46	31	73
1984	19	2	12
No reply	96	94	24
Total	204	204	204

a A minicomputer was purchased by a medical practice and has since been replaced.

In 1983, actual purchases reached their peak. (It is not inconceivable that by the end of the year 1984, purchases might have attained a similar level, but unless Christmas brought a very significant buying spree, it seems unlikely that the 1983 figure would have been much exceeded.) By 1983, the number expressing first interest in purchase was in decline. This may have been simply because in our respondent group a large proportion of those who wanted to buy had already purchased. However, there may be evidence here of a stalling in demand for microcomputers; recall the 'wait and see' attitude of non-owner respondents in support of that suggestion. Against that, however, it must be remembered that our respondents comprised only a quarter of those who received questionnaires, and that those who received questionnaires were far from a random sample of the population of Australia. For a person to be known to the Department of Continuing Education suggests that he or she has an unusually high level of commitment to self-education and self-improvement. Our survey indicates that among people of that type a good deal of careful thinking was going on, and that participation in computer-related courses may even have led, in some cases, to a decision against ownership. But we still know little about the views

and motivations of people **not** known to the Department of Continuing Education, so we cannot say with any certainty whether the market at large is experiencing or should expect a period of stagnation.

What will happen next? One possibility is that we are now entering a period of transition during which the bulk of the potential market (consumer imitators) will gradually start to follow the less risk-averse early adopters. On the other hand, there may simply be no 'second wave': given the existing nature of the product, and of tastes and consumer perceptions of the product's usefulness,the present market may already be near saturation.

TABLE 14

Degree of Satisfaction with Computer System

Level of satisfaction	Number	Percentage
Very satisfied	50	44
Moderately satisfied	53	47
Dissatisfied	5	4
Ceased use of system	1	1
No response	5	4
Total	114	100

We have already mentioned the high level of scepticism amongst our non-owners about the worth of a computer. We also have some positive evidence from our owners on the degree of satisfaction they derive from their computers (Table 14). Contrary to results of a survey reported by Davies, in which 58 per cent of 48 small business users were moderately satisfied or very dissatisfied and 5 per cent had ceased use of their systems, our respondents seemed remarkably satisfied.[4] Moreover, the source of any apparent dissatisfaction, whether moderate or substantial, was said to lie as much with after-sales service and support as with the equipment itself (Table 15). This evidence of satisfaction can be challenged on three grounds. First of all, most of the owners who responded were sufficiently motivated to have enrolled in courses related to computers (though not necessarily with the University of New England) and thus were in a position, potentially, to avoid some of the frustrations associated with ignorance. Second, a degree of self-justification may have led respondents to report a higher degree of satisfaction than they actually

felt; few of us like to admit having made mistakes in purchasing expensive equipment. Third, the non-respondents (far more numerous than respondents to our survey) may have experienced much greater levels of dissatisfaction. Nonetheless, the owner respondents would appear to be positively motivated agents of diffusion amongst their friends and colleagues.

TABLE 15

Sources of Dissatisfaction

Source of dissatisfaction	Number	Percentage
Computer system itself	18	16
After sales service and support with use	19	17
Both the above	6	5
No response	71	62
Total	114	100

Two final elements of information about owners' enthusiasm for their computers are found in their purchases of computer magazines and membership of user clubs. Table 16 shows that owners have a considerably higher propensity to take magazines than either non-owners or non-owner users. Results in Table 17 indicate a similar pattern for the membership of computer clubs.

TABLE 16

Number of Different Computer Magazines Purchased

Number of magazines	Number of respondents		
	Owners	Non-owners	Non-owner users
0	56	67	15
1	24	13	6
2	15	7	1
3	12	1	1
4	5	0	0
5	2	0	0
6	0	1	0
Total	114	90	23

TABLE 17

Membership of User Clubs

Ownership status	Member	Not a member
Owner	23	91
Non-owner	3	87
Non-owner user	0	23

TABLE 18

Distributions of Amounts Paid for Systems and Software

Expenditure range	All users	Non-business users
Expenditure on system		
Under $500	24	16
$500 to $2,499	38	19
$2,500 to $5,999	26	4
$6,000 and over	19	2
Total	109	41
Expenditure on software		
Under $100	8	6
$100 to $199	13	10
$200 to $499	19	12
$500 to $999	11	2
$1,000 to $9,999	26	3
$10,000 and over	2	0
Total	79	33

Table 18 shows the distribution of prices paid for computer systems and of amounts spent on software, for all respondents and for all non-business users. It is of interest to note that the correlation between computer prices and household incomes was very slight (the correlation coefficient was 0.0740). This result has other implications. We found that household income was only just positively related to

the probability of ownership, so that low-income households were about as likely, on average, to be owners as high- income households.[5] This might have been explained by a strong positive correlation between computer prices and household incomes. Since such a correlation was lacking, we concluded that high-income households exercised their budgetary freedom to buy either cheap or expensive systems by choosing in many instances to buy low-price models. To this, we would add that a strong enough pioneering instinct among lower income families would help to explain their purchases of relatively expensive systems. However, as Table 18 shows, there was one significant correlate of price paid, namely the type of usage. The most expensive systems were bought mainly by business users.

CONCLUSION

Despite the wealth of media discussion and speculation about microcomputer ownership in Australia, there has been relatively little fact upon which to rely. This paper has been prompted by that lacuna. We would argue that **interest** in computers has a close association with respondents working in the information sector and that **ownership** is motivated by the prospects of assisting with business tasks or by an atypically-intense degree of curiosity found among consumer pioneers — especially if they are highly educated. That said, many owners have far to go in putting their system to more effective use, it would seem, even though they already express a surprisingly high degree of satisfaction with their investment. Furthermore, many non-owner users remain sceptical about the value to them of microcomputer ownership, and one element of the potential market would seem to be awaiting a demonstration that ownership offers substantial services for which no good substitute exists at a competitive price. This, in turn, may require a significant expansion and improvement in services to owners available via the telecommunications network — such as electronic funds transfer, home shopping, and easy access to information for which subscribers are willing to pay.

NOTES AND REFERENCES

1. We are aware of the following surveys of microcomputer use on farms: S. J. Banfield and H. P. Cory, *A Study on the Use of On-farm Microcomputers in the United Kingdom,* Royal Agricultural College, Cirencester, England, 1980; M. Kirby and T. Rehman, 'Microcomputers and farm business management: What progress to date?' *Farm Management,* 5, 1, 1983, pp. 19-25; Centre for Management in Agriculture, *The Computer as a Farm Management Tool,* report prepared by Produce Studies Ltd., Newbury, England, 1984; and H. Westlake, 'The use of on-farm computers', paper presented to C.M.A.L Conference, Harrogate, England, 1984. (See also notes 3-5 below.)
2. Only the principal groupings of response are enumerated in Table 10. The totals given here are derived partly from figures which are shown in Table 10 and partly from primary source data.
3. T. G. MacAulay, 'The information revolution and Australian agriculture', paper presented to the Conference of Rural Officers of the Commonwealth Development Bank, Sydney, 1984.
4. N. Davies, 'The Australian business computer market', *Australian Computer Bulletin,* 8, 2, 1984, pp. 5-9.
5. P. H. Hall and J. J. Nightingale, 'The growth of microcomputer ownership', paper presented to the 13th Conference of Economists, Perth, Australia, 1984.