The Butler Cox Foundation

The Experience of Users of Data Base Management Systems



#### I Introduction

The term 'database' is an emotive one in computing. The advent of Data Base Management Systems (DBMS) has been hailed as the answer to the problems of data processing and deplored as an arcane mystery – an expensive distraction from the real world.

There is a great deal of literature, much of it complex and academic, but a shortage of hard facts about the practical experience of building and running a database.

The survey reported here was intended to tap the informed opinion of data processing managers with database experience and to substitute facts for opinions.

The current report is the main presentation of the results of the survey and is intended for management services directors and data processing managers.

A report on the Future of Data Base Management Systems is currently being prepared by Butler Cox and Partners Limited and will be distributed exclusively to members of the Butler Cox Foundation in June 1979. This report will consider the advances in DBMS technology, both hardware and software, to be expected during the next five years and the implications for current planning and Decision-making.

1 2 Waster The

## II Method

During October 1978 the Butler Cox Foundation (BCF) sent attractively designed questionaires to 500 computer users in continental Europe and the UK. The firms surveyed included the members of the BCF and were generally fairly large and known, or thought likely, to be using a DBMS. Questionaires were sent to a few computer bureaux.

By the end of January 1979, 100 replies had been received. This response rate (20%) compares favourably with that obtained in the USA during the same period by the DATAPRO organisation (9%). The larger total numbers in the DATAPRO poll (409 DBMS respondents to our 100) give its comparative findings more authority and this point is discussed further in Section VII. There was no follow-up of non-responders.

The questionaire asked for some general information about the machine and DBMS in use and the nature of the applications. There were then nine questions about the choosing and experience of DBMS which respondents were to answer quickly and subjectively.

#### III The Sample

The respondents included 5 Italian firms, 2 Belgian, 2 Dutch, 1 French and 1 Norwegian; the remaining 89 being British (at least by address). Eighteen were in the public sector.

The machines in use included: 59 IBM 360/370's, 8 ICL machines (from 2903 to 2980), 8 Burroughs (from B3500 to B6700), 7 Honeywell 6600's, 3 PDP11's, 2 Honeywell 600's, 2 Univacs, 2 HP3000's, plus a DEC10, a CMC Reality and an NCR Century. With regard to the UK it seems that ICL users and the public sector are rather under-represented but whether this is because they make less use of Databases or for other reasons one cannot say.

The respondents came from a wide variety of sectors with manufacturing being the best represented (40 respondents). There were also responses from 6 retail and distribution firms, 12 banking, finance and insurance firms, 6 transport utilities, 3 power utilities, 7 computer bureaux, 5 oil companies, 6 Post Office departments, 2 borough councils and 2 civil engineering practices.

The applications for which databases were being used were also very varied and the following partial list has been constructed (not all respondents replied clearly):

30 financial systems (of which at least 7 were processing operational data for finance companies) 2 credit control systems

- 14 order processing systems
- 16 production control systems
- 14 stock control systems
- 6 pay and/or personnel systems

3 distribution systems

- 8 management information systems
- 11 engineering and design systems
- 6 sales and marketing systems
- 4 administration systems
- l'corporate data control' system.

The 85 respondents who answered the relevant question claimed an average of over two years DBMS experience, but only 20 had more than three years experience. The sample as a whole probably had over 200 years experience; one user had been running a database for nine years.

The development of database usage, then, is still at an early stage. It is noteworthy that many of the firms responding have been major computer users for many years.

## **IV** User Satisfaction

Table

## Question 8 How do you feel about your experience with your DBMS?

	Numb	er of Users Cumulative Num	ıber
			]
		10 20 30 40 50 60 70 80 90 100	
Delighted	5		5
Very Pleased	37		42
, Quite Pleased	48		90
Rather Unhappy	6		96
Very Unhappy	0		96
Utterly Miserable	0		96
No Answer	4		100
Total	100		

Comment Almost 94% of respondents gave a positive response to this question, and even the negative responses were rather muted. This seems to validate the general claims made for the database approach. The absence of negative responses may arise partly from managers with bad experiences being unwilling to admit to them, even in confidence. There is, however, no actual evidence to this effect.

## Question 5 Please rate the DBMS you use in general terms on the scale below.

	Number of Users Cumulative Nu	mber
	10 20 30 40 50 60 70 80 90 100	
Excellent		10
Very Good	44	54
Satisfactory	38	92
Poor	4	96
Dreadful	0	96
No Answer	4	100
Total	100	1

Comment The generally high level of user satisfaction contradicts the impression sometimes given that DBMS are very troublesome and unreliable. The general satisfaction with the database approach (see Table 1, above) is clearly not obtained in spite of the DBMS but through it.

The 'poor' ratings were given to IMS (twice), DL/1, and to one inhouse system. The various DBMS are compared further in Section VII.



## V Users' Expectations and Evaluations

## Expectations

A number of benefits are commonly claimed for the use of a DBMS but these are not all equally applicable to all enterprises; e.g. a business that has adopted a disciplined approach to systems development in the past may not find claims of 'better data consistency' very impressive. Alternatively the manager may simply not believe that he will obtain a benefit.

We therefore asked (Table 3) as to the importance of the various putative benefits in the decision to establish a database.

Question 2 You must have had reasons for adopting a DBMS at all. Please read the list of possible benefits and grade them according to the influence they had on your original decision.

Т	a	h	10	3	
_ <b>_</b>	a	J	10	U	

	Number of Users reporting an influence that was:									
	Ver	y Str	ong							
		Stro	ong							
				_						
				Negligible						
	65 8 10 201		£1.0		No Answer	-				
Reduced programming effort in development	17	45	27	8	3					
Reduced programming effort in maintenance	31	36	24	7	2					
Reduced data duplication	29	35	19	13	4					
Better data consistency	27	46	13	11	3					
Faster response to new user requirements	28	51	15	3	3					

All the suggested benefits were felt to be important by most respondents and no one benefit was of overwhelming importance. The number of respondents reporting reduced programming effort in development as a very strong influence was significantly less than that for the other items. The number reporting faster response to new user requirements as a strong or very strong influence was somewhat larger than for the others.

Comment

In adopting the database approach managers were mainly seeking to provide their 'customers' with a better service rather than just to reduce their own costs.

Evaluations

One might expect that every user intending to build a database would make a careful comparative evaluation of the various DBMS before choosing one. In fact only 50 of our 100 respondents looked in depth at any other DBMS apart from the one they actually chose' (Question 3). We did not ask the reasons for this but in answering Question 4 (see Table 6) two were mentioned several times;

- Absence of choice (25 of those not making a comparative evaluation were users of non-IBM kit the majority of such users did not make a comparative evaluation whereas the majority of IBM users did).

- Corporate policy.

di.

Interestingly the users who DID make a comparative evaluation had a higher opinion of their chosen DBMS than the others. (See Table 4)

Table 4

	Nun	nber	ofUs	sers	rating their DBMS:	
	Ex	celle	ent			
		Ver	y Go	od		evinen, se
	X		Sati	sfac	tory	
				Poc	or	Manhotestrates
			4		No Answer	Overall Satisfaction
Comparative Evaluation	6	26	13	2	3	2.8
No such Evaluation	4	18	25	2	1	2.5

Note: Overall Satisfaction was calculated using Excellent = 4, Very Good = 3, Satisfactory = 2, Poor = 1.

Of the IBM users who did not make a comparative evaluation 19 out of 22 chose IBM products (IMS in 9 cases and DL/l in 10 cases), whereas of the 37 IBM users who did make a full evaluation, only 17 chose IBM products (IMS in 14 cases and DL/l in 3 cases). Since these IBM products, especially DL/l were less well regarded than competitive systems by our respondents as a whole the difference in overall satisfaction seems to be due to an inappropriate choice of system.

Question 9 Have you investigated any new DBMS developments and/or products?

Table 5	Number of Users	-		Γ	10	20	30	40	50	60	70	80	90	100
		ene i			a suc los		1					1		
	Yes		32			15722								
	No		45					2,51				6.	2-	đ
	No Answer	1.200	23		///////	//////	3							

Comment Once an installation has adopted a DBMS it will certainly be very difficult to change to another. Probably the managers responding were aware of this and have concentrated their energies on more immediate concerns.

# Question 4 Which factors most influenced your choice in favour of the DBMS you actually chose? Pick just three from the list below.

Number of Users		10 20 30 40 50 60 70 80 90
Ease of use anticipated	54	
Opinion of own technical staff	52	
Quality of anticipated after-sales service	37	
References from other users	35	
Quality of vendor's technical staff	25	100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100 - 100
Cost	20	1. 1. 1. C
Quality of vendor's sales staff	8	
Other factors (see below)	44	

Factors restricting choice:	Only system available (at that time)	ICL-IDMS	2
		IMS	3
		NCR-TOTAL	1
		FORTE1	1
		IMAGE/3000	2
	Required by operating system	DMIV	1
	Required by applications package	DS	1
	Company policy	DL/l	3
		IMS	1
Features of the DBMS:	Data compression	ADABAS	1
	Compatibility with TP monitor	IMS	4
	or other software	TOTAL	1
		MUMPSII	1
		DL/1	1
	Machine efficiency	ADABAS	2
		DS	1
	Internal structure	ADABAS	1
	Implemented data model can be close to conceptual data model	TOTAL	1
	Capability	ADABAS	1
	Ease of installation	IMS	1
		FORTE1	1
	Integrity, recovery	DMS	1
		IMS	1
		ADABAS	1
	Automatic report generation	Own software	1
	Ease of conversion	DMS1100	1
	Reliability	ADABAS	1
		IDS	1
	Portability	IDMS	2
	Simple language	Reality	1
	Specialised requirements	Own software	2
	Miscellaneous		4

Expected developments, etc:	Ease of evolution	TOTAL	1
	Planned enhancements	IDMS	1
	Support	IMS	3
	Developments	IMS	2
	Commitment	IMS	2
		DL/1	1
Features of supplier:	Experience of other products	TOTAL	1
	Manufacturer of hardware	IMS	1
*	Size of UK installed base	ADABAS	1
Miscellaneous:	Previous use of product	RAMIS	1
	Associated with choice of bureau and machine	IDS	1

Comment

The significance of the factors restricting choice has been discussed in connection with Table 4. The relatively small number of respondents mentioning cost confirms the conclusion reached above that managers were seeking to improve service rather than to save money. Of course,

improved service might well be worth money to the enterprise as a whole through improved cashflow, more attractive service to their customers, reduced bad debts, etc.

The factors most often mentioned 'spontaneously' are such as would make the DBMS easier to use. This is consistent with the popularity of the 'ease of use' factor amongst those offered on the questionaire. Respondents were also concerned about future developments of the product.

#### **VI** Users' Experiences

Question	6

Τ

on 6 What benefits have you actually achieved? Please read the list of benefits and grade them according to the degree of improvement or deterioration you have witnessed.

le7	Number of Users claiming a benefit:							
	Mu	chBe	etter	than	expected			
		Bet	ter th	ane	expected			
			Wo	rset	han expected			
Benefit				Mu	ch Worse than expected			
					No Answer			
Reduced programming effort in development	18	44	15	1	22			
Reduced programming effort in maintenance	13	43	9	1	34			
Reduced data duplication	18	57	3	0	22			
Better data consistency	18	54	1	0	27			
Faster response to new user requirements	17	38	17	1	27			

Comment Respondents seem to have had some difficulty in answering this question due partly, no doubt, to the fact that many were still implementing their DBMS or had only a few months' experience of operational running. The majority obtained greater benefits than they expected in all five categories and this remains true when the analysis is restricted to those cases where a benefit had a strong or very strong influence on the

user's decision to build a database. (See Table 8).

Benefits actually achieved by users strongly or very strongly influenced by that benefit.

	Number of Users claiming a benefit:									
the second s	Mu	chBe	etter	than expe	cted					
		Bet	ter th	an expect	ted					
Benefit		Worse than expected								
				Much Wo	orse than expecte	ed				
Reduced programming effort in development	16	32	6	0	1. 1. built					
Reduced programming effort in maintenance	12	30	5	0						
Reduced data duplication	15	40	2	0						
Better data consistency	15	42	0	0						
Faster response to new user requirements	16	31	8	0						

The preponderance of 'better' reports is striking, as is the absence of any 'much worse' reports. It seems that all the 'much worse' and most of the 'worse' results were obtained on matters that were not of great importance to the respondents (though these will have been different for different users).

Table 8

## VII Product Comparisons

## All Products The table below shows the answers to the questions:

Which DBMS to you mostly use? (Q1)

Please rate the DBMS you use in general terms. (Q5)

If you could go back in time and take the same decision again, what would you choose to take? (Q7)

Overall Satisfaction (Q5)

Same Decision Again (Q7)

Table 9

		[	Exc	eller	nt									
Jumber of Users			Γ	Very Good						SameDBMS				
				Γ	Satisfactory					DifferentDBMS				
DBMS (Supplier)					- [	Poo	r				NoDBMS			
						Γ	Not	Stated			ſ	No	Answer	
MS (IBM)	23		4	8	9	2	0		18	3	1	1		
DLI – DOS/VS (IBM)	11		0	4	6	1	0		8	3	0	0		
OLI – Entry (IBM)	2	-	0	0	2	0	0		0	1	1	0		
DMS – IBM (Cullinane)	4		2	1	1	0	0		4	0	0	0		
DMS – ICL	7		0	5	2	0	0		7	0	0	0		
TOTAL (CINCOM)	11		1	7 -	1	0	2		8	1	0	2		
ADABAS (Software AG)	9		0	.8	1	0	0		9	0	0	0		
DS1/2 (Honeywell)	8		1	4	3	0	0		7	1	0	0	447 2 4	
DMS I/II (Burroughs)	5		0	3	2	0	0		5	0	0	0	1	
FORTE 1/2 (Burroughs)	4		0	0	4	0	0		2	2	0	0	1	
RAMIS (Mathematica)	3		0	2	0	0	1		2	0	0	1	1979 B	
IMAGE/3000 (Hewlett-Packard)	2		0	0	2	0	0		2	0	0	0		
DMS1100 (Univac)	1		0	1	0	0	0		0	0	0	1		
DBS 90 (Univac)	1	s.	0	0	0	0	1		0	0	0	1		
DBOMP	1		0	0	1	0	0		0	1	0	0	N 1. 20 1. 1	
DMRS	+ 1		0	0	1	0	0		0	1	0	0		
MUMPSI	1		0	0	1	0	0		1	0	0	0		
DMIV (Honeywell)	1		0	0	1	0	0		1	0	0	0		
Users Own Software	4		1	1	1	1	0		4	0	0	0		
Not Stated	1		1	0	0	0	0		1	0	0	0	1.3	
Total	100		10	44	38	4	4		79	13	2	6		

Comment Despite being the DBMS most often reported IMS is not, on the whole, particularly well regarded by its users. DL/l is also frequently reported but it is striking that 10 of its 13 users did not first perform a comparative evaluation of DBMS (See Section V)

The users of non-IBM machines have little or no choice as to their DBMS (short of writing their own; a course followed by 2 IBM and 2 non-IBM installations).

Most users do not regret their choice of DBMS; a fact which gives particular significance to the 15 who do.

Major Products

Table 10

Following the DATAPRO approach an index of overall satisfaction was calculated for each product with 5 or more users. Responses were given these weights:

DATAPRO	Weight	Butler Cox			
Excellent	4	Excellent			
Good	3	Very Good			
Fair	2	Satisfactory			
Poor	1	Poor			

We also calculated an index of product loyalty – this was simply the proportion of users who would make the same DBMS choice again. This is less instructive than the first index since non-IBM compatible machines have much less choice – often no real choice at all.

In Table 10 the results of the current survey are compared with those of the DATAPRO poll reported in Datamation for December 1978.

DATAP	DATAPRO 1978				Butler Cox Survey						
OverallSat	Overall Satisfaction				erall Satisfaction						
Number of U	Number of Users				Number of Users						
Comparison of Major Products						Prod	uct Loyalty				
ADABAS	28	3.5		2.9	9	100%					
IDMS	42	3.5		2.9	11	100%					
IMAGE/3000	30	3.5			2						
DMS-I DMS-I		— 3.4		2.6	5	100%					
TOTAL	108	3.2		3.0	11	89%					
IMS	34	2.9		2.6	23	82%					
DL/1-DOS/VS	36	2.8		0.0	11	0004					
DL/l-Entry	8	3.0		۵.3	2	02%					
IDS1/2	-	-		2.8	8	88%					
Mean	-			2.6		84%					

Comment Allowing for the differences in method and the smaller numbers responding to the BCF survey the results are fairly similar except that:

DATAPRO got many more TOTAL users responding.

TOTAL was less well regarded by the American respondents.

This encourages some confidence in the other results of the current survey.

#### **VIII** Summary and Conclusions

The conclusions of the survey need to be treated with caution. The sample is not large enough to be regarded as wholly representative of computer users or even DBMS users at large. In addition the market is a complex one, with 21 commercial products on offer. That sector of the market occupied by IBM and its imitators is particularly large and highly competitive.

Despite all these reservations, three clear management lessons stem from the survey. They are interesting because in two cases they run directly counter to the acknowledged wisdom of the DP community. This acknowledged wisdom is that DBMS products have been oversold by their vendors; that users of them are customarily disappointed; that the benefits secured by users are customarily less than expected; and that brand loyalty and product satisfaction are low.

#### In fact the survey shows that:

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The DBMS experiment has been a success. All the products in the market (except a few older and more limited offerings) are well regarded by their users and brand loyalty is high. In the case of the major products, this finding is consistent with an American survey conducted independently.

Most users expected significant benefits from their DBMS: most achieved greater benefits than they expected. Benefits achieved included reduced programming effort through greater ease of use, less duplication of data, greater consistency of data and more rapid response to new requirements. In our view these findings represent an important vote of confidence on the part of the user community in the products now available.

Users should shop around for the product that suits them best. Thorough comparative evaluation is desirable, especially for customers of IBM to whom a wider choice is open.



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Butler Cox & Partners Limited Morley House, 26-30 Holborn Viaduct, London ECIA 2BP Telephone 01-353 1138, Telex 8813717-GARFLD