Peripherals for FY 92/93

Description	Equipment	Quantity	LOCAL PURCHASE Singapore $
Input	Bar code Reader	1	1,300
	Sub-total	1	1,300
Others	Agile Mouse	10	250
	Multimedia Upgrade Kit Business Bonanza	1	1,298
	Appl Support Resource Toolbook	1	75
	Multimedia Toolbook Resource Kit	1	300
	AI CD-ROM Disc	1	129
	VME Adapter board	1	2,650
	SCSI cable	3	480
	B 4681I Controller for NEC	1	2,338
	1MB memory Expansion	4	530
	Sub-Total	23	8,050
	Total	24	9,350

Peripherals for FY 93/94

Description	Equipment	Quantity	LOCAL PURCHASE Singapore $
Others	Soundblaster card	2	550
	Creative Soundblaster 16M CD	4	2080
	LCII 4MB to 12MB Ram upgrade	1	580
	Mac Rechargable battery	1	90
	MS Mouse	3	375
	Sub-Total	11	3,675
Output	White Light Projector	1	2400
	Barcographic CS 801 projector	1	25000
	Intel DVI Action Media II Borad	1	3800
	Sub-Total	3	31,200
	Total	14	34,875

Prototype Projects

Year (FY)	Public Sector		Private Sector	
	Prototype	Status (as of 31 Aug 94)	Prototype	Status (as of 31 Aug 94)
1991	–	–	HIE (Fuzzy controller)	In use
1992	MND (BPPS)	Being expanded	American MNC	Terminated
	TDB (HS Code)	Terminated	HIE (PTAS)	Completed, results used in subsequent projects
	SMRT (Maintenance)	In use	NEC	Terminated
			Omron	In use
			European MNC	Expanded
			SNS	In use
1993	MHA (Manpower)	Being proposed for implementation	Clarity	Expanded, to be sold
			Expert Edge(PSA-Quay Crane)	Incorporated in tender for new installation
	PSA (Training)	Set up MM centre	Intelliware/Kanishka	Expanded, to be sold
	MRTC (Signaling)	Under development	Matsushita	Under development
1994	MOH (Patient Billing)	Under development	Omron	Under development
	ROV (Help Desk)	Under development	OTIS	Under development
1994 (Pipeline)	CSCP (EUC)	–	SBS	–
	ROV (ERP)	–	CIS	–
	MOH (ICD)	–	Western Digital	–

資　　料

3　アンケート調査（英文)(和文)

1. INTRODUCTION

1.1 Objective

A short survey was carried out in June 94 with the objectives of getting an impression of how the AI industry has progressed in Singapore since 1991, as well as to gather views on how the industry is likely to progress in the next few years.

1.2 Definition

(a) The definition of AI projects include information systems employing either expert systems, neural networks, fuzzy logic, constraint satisfaction, case based reasoning, natural language processing or any technology that is generally accepted as part of the Artificial Intelligence domain.

(b) AI projects include delivery systems as well as prototypes developed by vendors and those done through public institutions.

1.3 Survey Method & Response

(a) A questionnaire was sent to 14 IT companies in Singapore that are known to be currently active in the sales, marketing, development and installation of AI solutions.

(b) The survey covered the years 1991, 1994, 1995, 1996 and 1997. Where vendors provide only partial or no projected numbers for future years, the figure from the last available year is extended through to 1997 without growth assumption. For example, if Vendor A provides only sales figures for 1991, 1994 and 1995. We assume the sales figures of 1996 and 1997 to be the same as 1995.

(c) 10 out of the 14 vendors responded to the survey.

1.4 Limitations

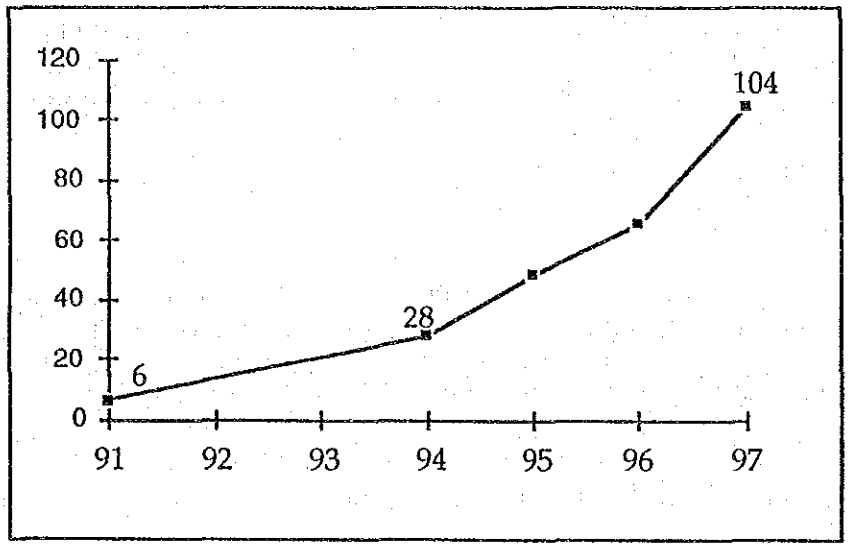
(a) The scope does not include user organisations and projects undertaken by them independent of vendors. This is because a much larger sample space would otherwise have to be included in the survey.

(b) It is estimated that this survey account for half to three-quarters of all AI projects done in Singapore.

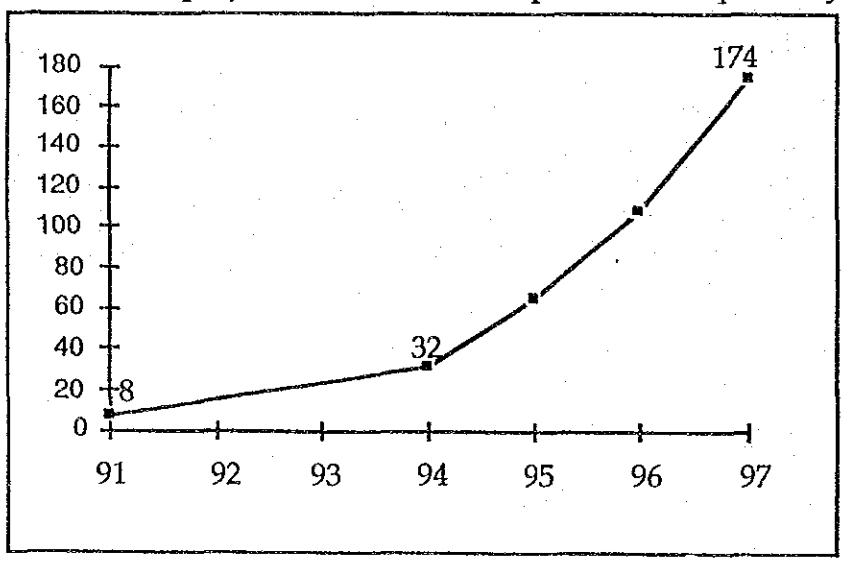
2. SUMMARY OF SURVEY

A summary of the survey is tabled in ANNEX A.

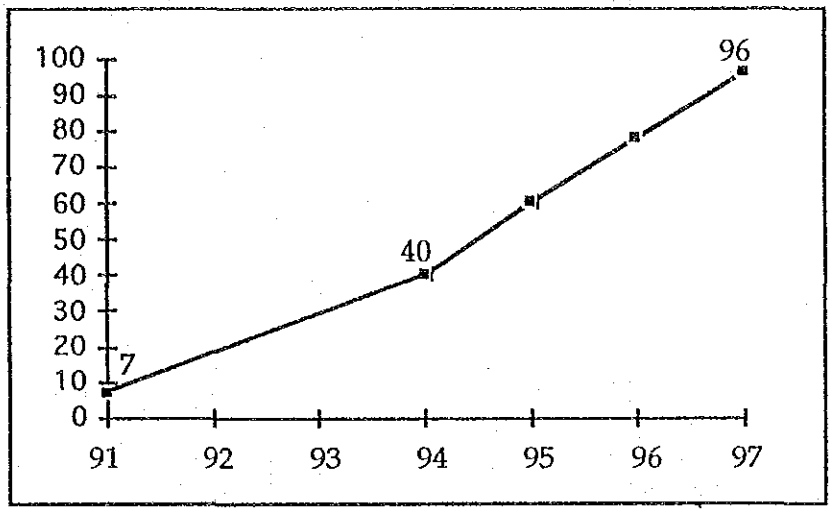
Number of new standalone AI projects in respective years



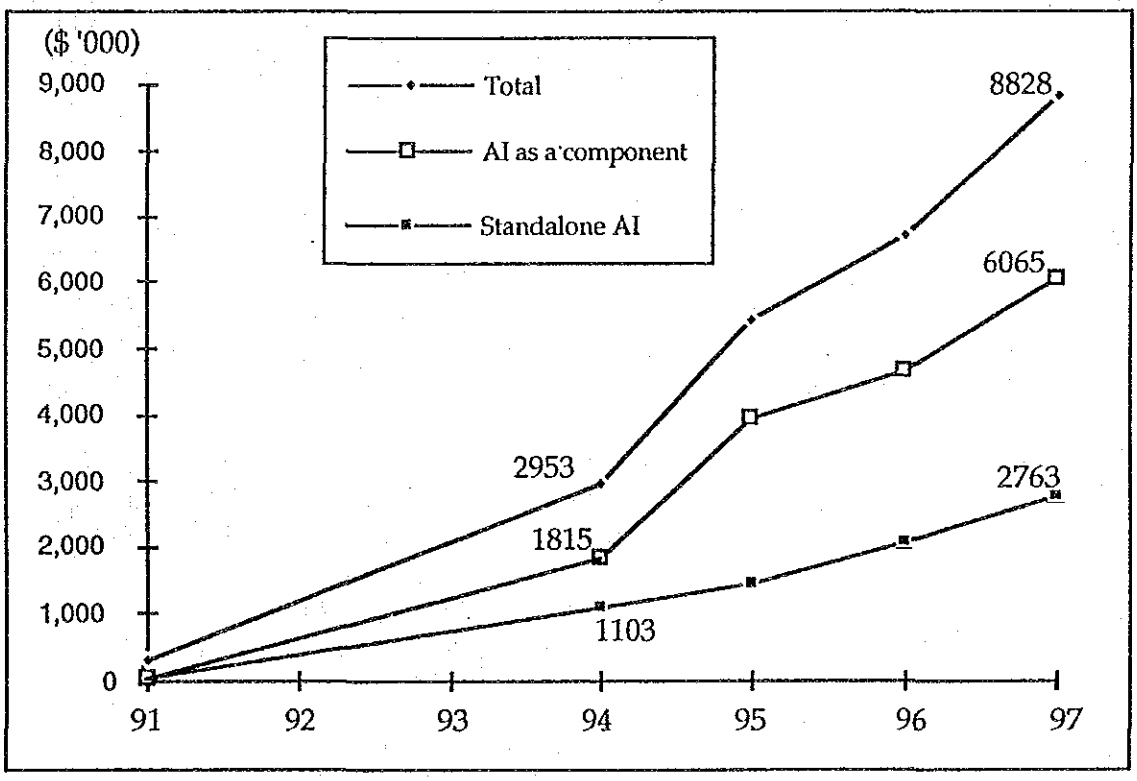
Number of new projects with AI as a component in respective years



IT Professionals with AI expertise employed



Revenue of AI related projects/sales



3. GROWTH

A summary of past and projected growth in the AI industry is tabled ANNEX B.

4. OBSERVATIONS AND INTERPRETATIONS

4.1 AI Projects

(a) This survey does not include user organisations. If we assume that for every project that vendors sell and develop, there is at least another project undertaken by user organisations independent of the vendor, for which are not reported in this survey, the number of projects in the industry can be postulated to be double the figures reflected in this survey. This assumption is reasonable because besides smaller users, larger ones like PSA, SMRT as well as institutions like JSAIC, ITI and ISS are known to have developed multiple projects on a single software license purchase from vendors.

(b) The number of new AI projects (standalone and where AI is a component) has been and is projected to increase at increasing rates for the survey period.

4.2 AI Specialists

(a) The demand for IT professionals with AI expertise by surveyed companies has been very strong. The demand is projected to grow at an annualised rate of 17% from now till 1997.

(b) The postulation of IT professionals with AI expertise working on AI projects is more difficulty than that done for the number of AI projects. However, if we simply assuming all such professionals employed by AI vendors are working on AI projects and equal number of such professionals work in user organisations, then the number of such professionals employed to work on AI projects would be double that captured in the survey.

4.3 AI Trends

(a) The expected growth trends indicate that more and more AI systems will be installed as a component in larger information systems. The percentage increased from 17% in 1991 to the projected 69% in 1997. This reflects both the maturing of technologies and understanding of the maturing (thus the applications) of intelligent systems.

(b) The high growth figures (ANNEX B) are due to the very small base. Nevertheless, the various growth indicators are significant.

ANNEX A : Summary of Survey

Item	1991 (past)	1994 (present)	1995 (estimate)	1996 (estimate)	1997 (estimate)
Number of new standalone AI projects installed/expected to be installed in respective years	6	28	48	65	104
Number of new projects with AI as a component installed/ expected to be installed in respective years	8	32	65	108	174
IT professionals with AI expertise employed/expected to be employed (cumulative)	7	40	60	78	96

Revenue source	1991 ($'000)	1994 ($'000)	1995 ($'000)	1996 ($'000)	1997 ($'000)
Standalone AI products/ solutions/consultancy/trg *(include only sales to end-users)*	250 (83%)	1,103 (37%)	1,463 (27%)	2,088 (31%)	2,763 (31%)
Systems (including hardware and software where AI is a component) *(include only sales to end-users)*	50 (17%)	1,850 (63%)	3,950 (73%)	4,650 (69%)	6,065 (69%)
Revenue Total	300 (100%)	2,953 (100%)	5,413 (100%)	6,738 (100%)	8,828 (100%)

ANNEX B : Annualised Growth in AI Industry

Annualised growth by item	**1991 - 1997**	**1991 - 1994**	**1994 - 1997**
Number of new standalone AI projects installed/expected to be installed in respective years	60.9%	67.1%	54.9%
Number of new projects with AI as a component installed/ expected to be installed in respective years	67.1%	58.7%	75.8%
IT professionals with AI expertise employed/expected to be employed (cumulative)	54.7%	78.8%	17.0%

Annualised growth in revenue	**1991 - 1997**	**1991 - 1994**	**1994 - 1997**
Standalone AI products/ solutions/consultancy/trg *(include only sales to end-users)*	49.2%	64.0%	23.6%
Systems (including hardware and software where AI is a component) *(include only sales to end-users)*	122.5%	233.2%	48.6%

3　アンケート調査（和文）

AIシステムに関する調査

1.　紹介

1.1　目的

ＡＩ産業がシンガポールに於てどれほど進歩したかという効果を捉え、かつ数年後には業界がどの様に進歩するかという展望を得る目的で、１９９４年６月簡易調査が行われた。

1.2　定義

(a)　ＡＩプロジェクトの定義は、エキスパートシステム・ニューラルネットワーク・ファジー理論・制約充足・事例ベース推論・自然言語処理或いは人工知能領域の部分として一般に受け入れられている技術を含む。

(b)　ＡＩプロジェクトの定義は、企業或いは公的研究所等で開発されたプロトタイプと共に実用システムを含む。

1.3　調査方法及び解答

(a)　アンケートは、現在ＡＩによる問題解決の営業・開発及び導入を活発に行っている14の情報処理会社へ送付された。

(b)　この調査は1991年・1994年・1995年・1996年そして1995年を包括する。企業が将来の予測数値を単に部分的或いは全く提供しなかったところでは、前年の利用可能な数値を成長推測なしに1997年まで使用した。例えば、仮に企業Ａが91年、94年及び95年のみの営業数値を提供した場合は、96年と97年の営業数値は95年と同様と見なした。

(c)　１４社中１０社が解答した。

1.4　制限

(a)　この範疇にユーザー団体或いは業者から独立して彼ら自身で実行されているプロジェクトは含まれない。でなければ非常に大規模のサンプル領域が含まれることになったからである。

(b)　この調査はシンガポールでなされた全てのＡＩプロジェクトの半分から４分の３を占めると推定される。

2.　調査要約

3. 成長

ＡＩ産業における過去及び予測されるプロジェクトの要約は表Ｂに示す。

4. 所見及び解説

4.1 ＡＩプロジェクト

(a) 当調査にユーザー団体は含まれない。業者が販売或いは開発した個々のプロジェクトに対して、少なくとも１つのプロジェクトが業者から独立してユーザー団体自らにより行われているならば（これらはこの調査では報告されていない）、業界におけるプロジェクトの数はこの調査に表れている数の倍にはなると仮定できる。この仮定は妥当である、というのも小規模のユーザーは別として、PSA（港湾局）SMRT（鉄道公団）などの大規模ユーザーやJSAIC・ITI・ISSのような施設は業者からの単一ソフトのライセンス購入により多数のプロジェクトを開発したことで知られているからである。

(b) 新しいＡＩプロジェクト（独立型或いはＡＩを構成単位とする）の数は調査期間中の増加率で増加して来ており、将来も同じ率で増加していくと予測される。

4.2 ＡＩ専門家

(a) 調査対象とした企業のＡＩ知識を持つ情報処理技術者に対する需要は極めて強かった。この需要は1997年までに年間17％の率での成長が見込まれる。

(b) ＡＩプロジェクトで働いているＡＩ知識を持つ情報処理専門家を推定することは、プロジェクト数以上に困難である。しかし、ＡＩに携わる企業に雇われている全ての専門家がＡＩプロジェクトに従事しており、同数の専門家がユーザー団体で働いていると仮定するならば、ＡＩプロジェクトに従事するため雇用された専門家の数はこの調査で捉えたものの倍にはなるであろう。

4.3 ＡＩ動向

(a) 予測される成長動向は、より多くのＡＩシステムが大規模な情報システムの構成単位として導入されることを示す。その割合は1991年の17％から1997年（見込）の69％に増加した。これは技術の成熟と知的システムの成熟度（応用）への理解両方を反映する。

(b) 高度な成長値(ANNEX B)は非常に小規模な母体のためである。にもかかわらず、多様な成長を示すものは重要である。

（日本語訳:丸山）