



Universiteit van Pretoria
University of Pretoria

FACULTY OF ENGINEERING, BUILT ENVIRONMENT AND INFORMATION
TECHNOLOGY

Department of Engineering and Technology Management

TECHNOLOGY LICENSING IN SOUTH AFRICA SURVEY

This is the first cross section survey of the views and activities of South African manufacturing companies regarding technology licensing. The results will be collated and analysed as part of a doctoral study on the subject, extracts from the collated results will be published and will be shared with respondents wishing to do so. The thesis itself will contain collated results and will be open to the public.

Individual confidentiality will be respected and maintained.

Your kind co-operation in completing and returning this questionnaire shall be greatly appreciated by both the student and the Department of Engineering and Technology Management of the University of Pretoria. About 50 minutes will be required. We trust you will also find some of the questions stimulating!

Please return the completed questionnaire as follows:

To fvanvuuren@ifc.org or to University of Pretoria
Department of Engineering and Technology Management
Lynnwood Road
Pretoria
0002 Attention Mr F J J van Vuuren

Fax number 012-362-5307

Should any questions arise, please do not hesitate to take them up with

(Student) Francois J J van Vuuren at cell phone number 083-399-9801
or at fvanvuuren@ifc.org .

Please attempt to return the questionnaire as soon as possible – during October?

Please take a minute to read the brief instructions appearing overleaf

Orientation and instructions.

Please bear the following definitions in mind:

- **Technology** is the knowledge, concretely or abstractly embodied, underlying machinery, equipment and processes severally and jointly and by means of which productive systems, products or services are constructed, operated, manufactured and supplied, as well as used, for economic benefit.

Fruits of the mind or intellect such as works of fine art, music, poems and the like are excluded because of their aesthetic rather than industrial character.

Fine arts such as music, literature and paintwork are excluded except in so far as they may be employed for commercial purposes such as image building and advertising other goods or services.

- **Innovation** is the ongoing as well as recently completed rearrangement in novel ways of technical and scientific as well as organizational elements for economic benefit.
- **In-licensing** refers to your company being the licensee and **out-licensing** to your company being the licensor.

- Please disregard all response numbering signs. These appear in the following forms: *italic 1, 2 ... 10, 1...10. ...*
- Do not write on any shaded area.
- Special request: It is difficult to convey some concepts in a word or two. Therefore, if a question is unclear, please draw a line through it rather than guess at its meaning, perhaps providing a misleading response.

.....
F J J van Vuuren Pr. Eng.

It is hereby confirmed that the questionnaire is being returned with the concurrence of the Chief Executive Officer, under the conditions and for the purposes set out on the front page:

Name	
Position	
Signature	
Date	

1. COMPANY.

Questionnaire number

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Company name	1											
Physical address											
Industry – describe	2											
Respondent's name							Telephone:					
Respondent's function/ title												
No of employees	3		1 <50			2 50 – 249			3 250 – 500		4 >500	
Major product/service	4											
Ownership (✓ one or more)	5		Private		Public		Domestic		Foreign		Domestic/foreign	
Owns other companies	6		In RSA:		1 Yes		3 No		5			
	7		Elsewhere:		2 Yes		4 No					
Domestic sales (Rm/year)	8/9		1 <10	2 10-50	3 51-200	4 201-500	5 >500	6 % involving in-licenses:		%		
Export sales (Rm/year)	10/11		1 <10	2 10-50	3 51-200	4 201-500	5 >500	6 % involving in-licenses:		%		
Tick ISO certification obtained	12		1 9001/2000		2 9001/1994		3 9002/1994		4 9003/1994		5 140001	

2. HOW DO YOU PERCEIVE THE COMPANY'S GOVERNANCE MILIEU?

In each row mark block containing the closest description.

	1	2	3	4	5
Is the company's usual style that of a risk taker or is it conservative? 13	Risk taker	Tend to risk	Neutral	Careful	Conser- vative
Is it a pioneer or a follower? 14	Pioneer	Careful	Neutral	Careful	Follower
Its awareness of competitor's successes is 15	Complete	Active	Average	Vague	None
Its awareness of competitors' failures is 16	Complete	Active	Average	Vague	None
Its awareness of competitors' technology licensing activities is 17	Complete	Active	Average	Vague	None
Top management's attitude to licensing? 18	Likes	Uses	Accepts	Ignores	Dislikes
Overseas experience is 19	Excellent	Good	Fair	Some	None
Travel abroad is 20	Extensive	Often	Regular	Sporadic	None
Management education is 21	Best	Good	Average	Uneven	Weak
Are operations capital intensive? 22	Extreme	Very	Average	Partly	Not at all
Is production automated? 23	Extreme	Mostly	Mix	Minor	Job shop
Company's environment-friendliness is 24	Extreme	Positive	Average	Grudging	Not at all

Which of the attributes following characterize your accounting system? (Mark one or more.)							25
Divisional	Product line	Detailed cost	Short term view	Long term view	Encourages innovation	Imposed by parent	Recognises licensing income
1	2	3	4	5	6	7	8

3. PLEASE CHARACTERISE THE COMPANY'S SENSE OF ITS ENVIRONMENT.

Mark one descriptive block in each row.

	1	2	3	4	5
Market competition is 26	Fierce	Strong	Fair	Minimal	None
Technology competition is 27	Fierce	Strong	Fair	Minimal	None
Manpower is available 28	Scarcely	Can find	Fair	Can select	Abundant
Has the company made use of or is it making use of National funding for innovation?					
SPII funds 29	Maximally	Yes	Tried	No	What is it?
Innovation fund of DTI 30	Maximally	Yes	Tried	No	What is it?
THRIPs funds 31	Maximally	Yes	Tried	No	What is it?
Other DTI/IDC/DACST funds 32	Maximally	Yes	Tried	No	What is it?
What is the company's impression of the following legal and control systems?:					
RSA's patent system 33	Perfect	Good	Fair	Improve	Unsound
RSA's designs system 34	Perfect	Good	Fair	Improve	Unsound
RSA's trade marks system 35	Perfect	Good	Fair	Improve	Unsound
Agreement control – in RSA 36	Perfect	Good	Fair	Improve	Unsound
- abroad 37	Perfect	Good	Fair	Improve	Unsound
Exchange control – in RSA 38	Perfect	Good	Fair	Improve	Unsound
- abroad 39	Perfect	Good	Fair	Improve	Unsound
Co's international co-development 40	Intensive	Frequent	Often	Seldom	Not at all
Co. involved in offset/countertrade? 41	Intensive	Frequent	Often	Seldom	Not at all
Is the company striving to progress from original equipment to own design to own brand manufacture? 42	Already own brand manufacturer	Across the board	Most products	Some products	Not at all

4. PLEASE DESCRIBE SOME ASPECTS OF THE COMPANY'S ORGANISATION.

Mark **at least one** descriptive block in each row offering alternatives.

	1	2	3	4
How is the company organised and spread geographically in the RSA? 43	One unit	Strategic Business Units	Divisions	Two or more locations
Research & development is operated within 44	One unit	Strategic Business Units	Divisions	No R&D
R&D reports to 45	One unit	Strategic Business Units	Divisions	
To whom does the Head of R&D report, if R&D function exists? 46	Position title:			
Licensing is seen as a 47	Cost centre	Service centre	Profit centre	None
To whom does the Head of Licensing report, if licensing function exists? 48	Position title:			
Is the organisation alert to the need to; and deliberately maximising technology capability among :				
Disciplines? 49	Continually	Sporadically	Not at all	Not applic.
Functions? 50	Continually	Sporadically	Not at all	Not applic.
Strategic Business Units? 51	Continually	Sporadically	Not at all	Not applic.

Does the organisation encourage personnel to innovate regarding:					
Products and processes?	52	Continually	Sporadically	Not at all	Not applic.
Production?	53	Continually	Sporadically	Not at all	Not applic.
Logistics?	54	Continually	Sporadically	Not at all	Not applic.
Management?	55	Continually	Sporadically	Not at all	Not applic.

5. INTELLECTUAL PROPERTY

Mark at least one descriptive block in each row.

		1	2	3	4	
		RSA		Elsewhere		
Any patents or applications?	101	Yes	No	Yes	No	
Total number (approx.)	102					
Any designs or applications?	103	Yes	No	Yes	No	
Total number (approx.)	104					
Any trade marks or applications?	105	Yes	No	Yes	No	
Total number (approx.)	106					
Broadly, for what purpose do you use your intellectual property? (✓ one or more)	107	To monopolise	To deter others	To earn royalties	To defend if sued	
Our intellectual property data base is	108	Organised	So-so	None		
Intellectual property planning is done	109	Regularly	Sporadically	Never		
We have confidentiality agreements with	110	Employees	Visitors	Inventors		
Aware of RSA's TRIPS obligations?	111	Well	Reasonably	Not really		
Which lawyers do you use for licensing?			2	3		
Lawyer on staff (✓ none, one, or more)	112	General counsel	Patent counsel	None		
Outside lawyer (✓ none, one, or more)	113	General counsel	Patent counsel	None		
Mark other patent systems you use (✓)	114	1	2	3	4	
Which technology sources do you use? (✓ one or more)	115	EEC	ARIPO	Eurasian	OAPI	PCT
		Internal R&D	Contract out	License in	Own innovation	None

6. HOW DO YOU PERCEIVE THE COMPANY'S CAPABILITIES?

Mark one block in each row.

		1	2	3	4	
R & D is	116	Excellent	Good	Adequate	Poor	None
R&D with intent to license is	117	Excellent	Good	Adequate	Poor	None
Technology design is	118	Excellent	Good	Adequate	Poor	None
Technology development is	119	Excellent	Good	Adequate	Poor	None
Technology licensing and selling is	120	Excellent	Good	Adequate	Poor	None
Unwritten (tacit) knowledge is	121	Excellent	Good	Adequate	Poor	None
Access to complementary assets is	122	Excellent	Good	Adequate	Poor	None
Our technology portfolio is	123	Complete	Good	Adequate	Poor	None
Our forward planning techniques include the following in which our capabilities are as described:						
Scenario planning ability is	124	Excellent	Good	Adequate	Poor	None
S-curves awareness is	125	Excellent	Good	Adequate	Poor	None
Other techniques are	126	Excellent	Good	Adequate	Poor	None
Our technology strategy planning is	127	Regular and complete	Sporadic, complete	Sporadic, partial	Ad hoc	None
Our internal technology/core competence auditing is	128	Regular and complete	Sporadic, complete	Sporadic, partial	Ad hoc	None

Our external technology/core competence auditing is 129	Regular and complete	Sporadical, complete	Sporadical, partial	Ad hoc	None
The occurrence of the Not Invented Here or NIH syndrome is 130	Pervasive	Bothersome	Isolated	Absent	

7. WHICH SOURCES OF INFORMATION DO YOU USE AND HOW?

Mark one descriptive block in each row.

		1	2	3	4	
Use of one or more gate keeper is 131		Extensive	Often	Sporadic	Seldom	Never
Use of journals/papers is 132		Extensive	Often	Sporadic	Seldom	Never
Use of professional literature is 133		Extensive	Often	Sporadic	Seldom	Never
Library use is 134		Extensive	Often	Sporadic	Seldom	Never
Use of RSA patent specifications is 135		Extensive	Often	Sporadic	Seldom	Never
Use of foreign patent specifications is 136		Extensive	Often	Sporadic	Seldom	Never
Visits to RSA fairs, exhibitions are 137		Extensive	Often	Sporadic	Seldom	Never
Visits to foreign fairs, exhibitions are 138		Extensive	Often	Sporadic	Seldom	Never
Use of universities/research institutes						
in RSA is 139		Extensive	Often	Sporadic	Seldom	Never
in other countries is 140		Extensive	Often	Sporadic	Seldom	Never
Local information seeking visits are 141		Extensive	Often	Sporadic	Seldom	Never
Information seeking visits abroad are 142		Extensive	Often	Sporadic	Seldom	Never
Use of parent/daughter/sister company is 143		Extensive	Often	Sporadic	Seldom	Never
Polling of customers for information is 144		Extensive	Often	Sporadic	Seldom	Never
Polling of suppliers for information is 145		Extensive	Often	Sporadic	Seldom	Never
Use of new personnel is 146		Extensive	Often	Sporadic	Seldom	Never
Use of consultants is 147		Extensive	Often	Sporadic	Seldom	Never
Use of in-licences is 148		Extensive	Often	Sporadic	Seldom	Never

8. WHERE DO YOU SOURCE YOUR IN-LICENSABLE TECHNOLOGY?

(Numbers in brackets are provided as examples – please overwrite.)

Please weigh the sources of your in-licensed technology according to perceived incoming volume plus quality – not sales. Please enter % such that total is 100%.

Source of technology		1	2	3
		Geographic source		
		Domestic	Foreign	Total
Suppliers 201		(5)		(5)
Customers 202		(5)		(5)
Other companies 203	(40)			(40)
Researchers/laboratories 204				
Government agencies/laboratories 205				
Inventors 206	(40)			(40)
Patent literature 207				
Friends/acquaintances 208	(10)			(10)
Broker/agent assisted 209				
Total of all above 210	(90)	(10)		100

9. HOW IS CORPORATE LEARNING MANAGED WHEN TECHNOLOGY IS LICENSED INWARDS?

Mark one block in each row.

		1	2	3	4
Planning horizon is	211	Long term	Sporadic	Short	Immediate
Strategic intent is communicated to all personnel	212	Fully	Reasonably	Sketchy	Not
Priority of learning in venture is	213	Top	Planned	Also ran	Neglected
Learning process is	214	Planned	Fair	Sketchy	Random
Human Resources are involved	215	Fully	Fair	In passing	Not at all
Staffing assignments are	216	Thorough	Fair	To get by	Neglected
Team members are	217	Top class	Fair	Can improve	Inadequate
Control is	218	Taken over	Shared	Poor	Surrendered
Learning depends on partner	219	Not at all	50:50	Largely	Completely
Cross-cultural competence is	220	Excellent	Good	Average	Poor
Cross-disciplinary competence is	221	Excellent	Good	Average	Poor
Team career structure plan is	222	Clear	Framework	Vague	Not at all
Responsibility for learning is	223	Clear	Good	Vague	Not clear
Performance measures are	224	Long term	Medium term	Short term	Immediate
Rewards for learning are	225	Excellent	Fair	Poor	Absent
Tolerance of learning barriers is	226	High	Acceptable	Sketchy	Absent

10. CURRENT LICENCES – TO AND FROM WHICH COUNTRIES?

Please **exclude** pure trade mark, copyright and distribution-only licences. Leave blank if nil.

	1	3	4	5	7	9			
	RSA	Africa	Europe	North Amer.	South Amer.	Asia	Middle East	Vari-ous	Total
Number of in-licences	227								
Number of out-licences	228								
Years experience	229								

11. AS HOW SERIOUS DO YOU REGARD THE FOLLOWING REASONS TO LICENSE IN OR OUT?

Rank **each** reason on a scale between 0 (no relevance) and 9 (most important). Rank for both **in-** and **out-**licensing, please. Do not write in shaded boxes.

Reason for licensing			Reason for licensing ctnd		
	1 In	2 Out		1 In	2 Out
Cost advantage	230		Market entry	238	
Risk reduction	231		Substitute direct sales	239	
Access to future technology	232		Regional differences	240	
Skills acquisition	233		To set industry standards	241	
Competitive advantage	234		Settle/prevent infringement	242	
Diversification advantage	235		More innovative technology	243	
Spin-off technology	236		Response to competitors	244	
Strategic reasons	237		Comply with patent working requirements	245	

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12. WHAT FACTORS INFLUENCE THE MAGNITUDE OF THE ROYALTY AND OTHER REMUNERATION FOR BOTH IN- AND OUT-LICENCES?

Rank **each** factor on a scale between 0 (no relevance) and 9 (most important). Rank for both **in-** and **out-**licensing, please.

Factor	1		Factor continued	2	
	In	Out		In	Out
Industry norms 301			Age/maturity of technology 312		
R&D expenditure 302			Patent life remaining 313		
Licensee's market size 303			Patent strength 314		
Cost of lost opportunity 304			Characteristics of licensee nation 315		
Transfer cost 305			Lump sums 316		
Technical 306			Grantbacks 317		
Legal 307			Risk 318		
Marketing 308			Exclusivity 319		
Training 309			Trade mark 320		
Assistance offered 310			Take what's available 321		
Technical assistance fees 311					

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13. WHICH METHOD IS USED TO DETERMINE THE ROYALTY RATE? **14. HOW FREQUENTLY/STRONGLY ARE THE FOLLOWING RESTRICTIONS SOUGHT?**

Rank **each** method and **each** restriction on a scale between 0 (method not used and restriction not sought) and 9 (most important). Rank for both **in-** and **out-**licensing, please.

Calculation method	1		Restriction	2	
	In	Out		In	Out
Income based 322			Territorial 328		
25% rule 323			Export quantity 329		
Discounted cash flow 324			Export price 330		
Asset based 325			Grantbacks 331		
Mixture 326			Tied supply 332		
Other (please mention immediately below) 327			Export through designated agent 333		
			Prohibition on handling competitors' products 334		
			Quality controls on materials 335		
			Quality controls on finished products 336		

15. HOW FREQUENTLY IS THE FOLLOWING USED AS A BASE TO CALCULATE ROYALTY?

16. HOW FREQUENTLY DO THE LICENCE AGREEMENTS INCLUDE THE FOLLOWING LICENSED INTELLECTUAL PROPERTY?

Rank **each** base and each content type on a scale between 0 (never) and 9 (most frequent occurrence). Rank for both **in-** and **out-**licensing, please.

Base on which royalty is calculated	1		Content of licences	2	
	In	Out		In	Out
Sales % 337			Know-how only 343		
Net sales % 338			plus trade mark 344		
Profit % 339			Patent only 345		
Per unit 340			plus trade mark 346		
Period amounts 341			Know-how plus patent 347		
Other (please describe) 342			plus trade mark 348		

17. PAYMENT TYPE

Assign number to indicate frequency of occurrence out of maximum 9.			
Payment type		1	2
		In	Out
Up front lump	349		
Running royalty	350		
Lump sum + running royalty	351		
Minimum royalties/payments	352		

18. TECHNOLOGY MATURITY PREMIUM

What royalty will apply if fully developed technology earns 9%?			
Maturity stage		1	2
		In	Out
Fully developed	353	9	9
Pilot/prototype	354		
Detailed design	355		
Laboratory stage	356		

19. AS HOW SERIOUS DO YOU REGARD THE FOLLOWING OBJECTIONS TO LICENSING?

20. WHAT IS THE RELATIVE IMPORTANCE OF THE FOLLOWING FACTORS TO YOU IN LICENSING?

Rank **each** objection and factor on a scale between 0 (no relevance) and 9 (most serious and important). Rank for both **in-** and **out-**licensing, please. Do not write in shaded boxes.

Objection		1	2
		In	Out
Reveal own know-how	401		
Dilute market	402		
Lose close control	403		
Debilitate or subjugate own R&D	404		
Administrative burden	405		
Build licensor's trade mark	406		
Excessive grantback required	407		

Factor		1	2
		In	Out
Governing law	408		
Accounting	409		
Confidentiality	410		
Provisions regarding improvements	411		
Dispute resolution	412		
Infringement/enforcement	413		
Non-contest clause	414		
Provision of service	415		
Termination	416		

21. HOW FREQUENTLY DOES TECHNOLOGY WITH THE IMPACT INDICATED OCCUR IN YOUR LICENCES?

22. HOW FREQUENTLY ARE THE FOLLOWING METHODS USED TO IDENTIFY POSSIBLE LICENSEES?

Rank **each** reason and each method on a scale between 0 (never) and 9 (most frequent). Rank for both **in-** and **out-**licensing, please.

Impact		1	2
		In	Out
Revolutionary	417		
Major improvement	418		
Minor improvement	419		

Method/place		Out
Shows/fairs	420	
Desk search	421	
Broker/agent	422	
Word of mouth	423	
We know industry	424	

23. HOW INTENSELY/FREQUENTLY ARE THE FOLLOWING DEPARTMENTS/FUNCTIONS INVOLVED IN THE LICENSING PROCESS?

Rank **each** department on a scale between 0 (never) and 9 (most frequently). Rank for both **in-** and **out-**licensing, please.

Department or function	Evaluation of subject technology		Negotiation		Agreement (contract) compilation		Contract administration	
	1	2	3		5	6	7	8
	In	Out	In	Out	In	Out	In	Out
Legal 425								
Research 426								
Licensing 427								
Accounting 428								
Sales/marketing 429								
Technical/engineering 430								
Manufacturing 431								
Top management 432								
Outside counsel 433								
Broker/agent 434								

24. HOW ARE POTENTIAL LICENSEES APPROACHED?

25. RELATIVE VALUE OF VARIOUS FORMS OF INTELLECTUAL PROPERTY.

Assign number to indicate frequency of occurrence between 0 and maximum 9 for both in- and out-licensing.







Approach	1	2
	In	Out
General mailshot 435		
Selective mail 436		
In person by visit 437		
Following study of target 438		
Target invited to visit licensor 439		
Via broker 440		
IP assigned to broker 441		

Assign number to indicate value between 0 and maximum 9 for both in- and out-licensing

Licensed technology	1	2
	In	Out
Patent 442		
Know-how 443		
Trade mark 444		

26. VARIOUS

Mark a block in each in- **and** out-license row.

			1	2	3	4	5
Usual size of other party (US\$million/yr sales) (R10 = US\$1) 445		In	<5	5 to 25	25+ to 50	50+ to 100	>100
		Out	<5	5 to 25	25+ to 50	50+ to 100	>100
To what extent does technology have to be adapted? 446		In	Extensively	Moderately	Not at all		
		Out	Extensively	Moderately	Not at all		
Does your Board of Directors have sufficient relevant technology know-how? 447			Amply	Moderately	Not at all		
Is R&D cost taken as sunk? 448		In	Yes	Sometimes	Never		
		Out	Yes	Sometimes	Never		
Do you believe that licensing is profitable for the licensor? 449		In	Very much	Yes	Worthless		
		Out	Very much	Yes	Worthless		
Is transfer cost pertinently charged? 450		In	Always	Usually	Never		
		Out	Always	Usually	Never		
			1	2	3	4	
Type of relationship involving licence (✓) 451		In	Licence	Cross-licence	Co-development	Joint venture	
		Out	Licence	Cross-licence	Co-development	Joint venture	

27. PROBLEMS FROM AGREEMENTS

We shall appreciate it if you would mention licensing problems you may have experienced and which you consider to be out of the ordinary:

Inter-sector characteristics

Annexure B

Sector/group & characteristic	Companies reporting capability or characteristic (%)					N
	Extreme	Very	Average	Partly	Not at all	
Capital intensity						
Automotive components	0	50	30	20	0	10
Building materials and components	14	29	57	0	0	7
Chemicals including paper & textiles	23	31	38	8	0	13
Electrical, light	0	67	17	17	0	6
Heavy engineering	18	45	27	9	0	11
Food & healthcare	40	30	30	0	0	10
ICT & electronics	0	11	33	56	0	9
Metal products & machinery	0	50	36	14	0	14
Automation	Extreme	Mostly	Mix	Minor	Job shop	
Automotive components	0	20	50	30	0	10
Building materials and components	0	43	43	14	0	7
Chemicals including paper & textiles	15	15	38	31	0	13
Electrical, light	0	50	33	0	17	6
Heavy engineering	0	9	55	27	9	11
Food & healthcare	9	55	27	9	0	11
ICT & electronics	0	11	44	11	33	9
Metal products & machinery	0	29	36	14	21	14
Research & development is	Excellent	Good	Adequate	Poor	None	
Automotive components	0	20	50	20	10	10
Building materials and components	0	43	57	0	0	7
Chemicals including paper & textiles	23	46	23	0	8	13
Electrical, light	67	17	17	0	0	6
Heavy engineering	0	55	0	18	18	11
Food & healthcare	30	30	20	20	0	10
ICT & electronics	67	22	0	11	0	9
Metal products & machinery	7	50	21	21	0	14
R&D with intent to license is						
Automotive components	0	20	0	20	60	10
Building materials and components	0	14	29	29	29	7
Chemicals including paper & textiles	20	8	15	38	31	13
Electrical, light	0	0	33	17	50	6
Heavy engineering	0	18	18	27	36	11
Food & healthcare	20	20	30	20	10	10
ICT & electronics	11	33	0	33	22	9
Metal products & machinery	7	0	29	35	29	14
Design is						
Automotive components	10	70	10	0	10	10
Building materials and components	14	14	57	14	0	7
Chemicals including paper & textiles	23	69	8	0	0	13

Electrical, light	33	50	17	0	0	6
Heavy engineering	27	55	0	9	9	11
Food & healthcare	10	70	0	10	10	10
ICT & electronics	56	33	0	11	0	9
Metal products & machinery	29	36	29	0	7	14
Development is						
Automotive components	0	70	20	0	10	10
Building materials and components	14	14	71	0	0	7
Chemicals including paper & textiles	23	54	23	0	0	13
Electrical, light	17	67	0	0	17	6
Heavy engineering	18	27	18	9	27	11
Food & healthcare	10	70	0	10	10	10
ICT & electronics	56	33	0	11	0	9
Metal products & machinery	21	29	36	7	7	14
Technology licensing & selling is						
Automotive components	0	10	20	10	60	10
Building materials and components	0	29	29	43	0	7
Chemicals including paper & textiles	0	8	25	33	33	12
Electrical, light	0	17	17	0	67	6
Heavy engineering	9	9	36	18	27	11
Food & healthcare	10	20	30	10	30	10
ICT & electronics	0	11	44	44	0	9
Metal products & machinery	8	8	31	23	31	13

Sources of technology

Annexure C

Industry sector	Automotive components		Building aterials & components		Chemicals incl. paper & textiles		Electrical, light		Heavy engineering		Food & healthcare		ICT & electronics		Metal products & machinery		All	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Source																		
Internal R&D=1	2	20							2	18	2	20	1	11	3	23	10	13
Contract out=2			1	17													1	1
License in=3		10	1	17	1	8			1	9					1	8	4	5
Own innovation=4	1	10	1	17	1	8			3	27			1	11	1	8	8	10
None							1	17									1	1
1, 2	1	10							1	9	1	10	1	11	1	8	5	6
1, 3			1	17	1	8											2	3
1, 4					3	23	3	50			2	20	1	11	3	23	12	16
2, 3	1	10															1	1
2, 4	1	10													1	8	2	3
3, 4									1	9	1	10					2	3
1, 2, 3	1	10															1	1
1, 2, 4	1	10					2	33	1	9	2	20	1	11	1	8	8	10
1, 3, 4	1	10	1	17	4	31					1	10	3	33	2	15	12	16
2, 3, 4									1	9							1	1
1, 2, 3, 4	1	10	1	17	3	23			1	9	1	10	1	11			8	10
Total reports	10	100	6	100	13	100	6	100	11	100	10	100	9	100	13	100	77	100
Companies in sector	10		7		13		6		11		11		9		14		81	
Companies using any one source:																		
Internal R&D=1	7	70	3	50	11	85	5	83	5	45	9	82	8	89	10	71	58	75
Contract out=2	6	60	2	33	3	27	2	33	4	36	4	36	3	33	3	21	27	35
License in=3	4	40	4	67	9	82	0	-	4	36	3	43	4	44	3	21	31	40
Own innovation=4	5	50	3	33	11	85	5	83	7	64	7	64	7	78	8	57	53	69

Capability rating

Annexure D

MNR F JANSE VAN VUUREN T02095 IH399420 IHB9005 1
 09:13 Friday, June 13, 2003

The FREQ Procedure

			Cumulative		Cumulative	
AGRV98_V99	V123	AGRV133_V135	Frequency	Percent	Frequency	Percent
1	1	1	1	1.25	1	1.25
1	1	2	1	1.25	2	2.50
1	1	3	1	1.25	3	3.75
1	2	2	2	2.50	5	6.25
1	3	1	2	2.50	7	8.75
1	3	4	1	1.25	8	10.00
1	3	5	1	1.25	9	11.25
1	4	2	1	1.25	10	12.50
1	4	3	2	2.50	12	15.00
1	5	3	2	2.50	14	17.50
1	5	4	1	1.25	15	18.75
2	1	1	2	2.50	17	21.25
2	2	1	3	3.75	20	25.00
2	2	2	3	3.75	23	28.75
2	2	3	1	1.25	24	30.00
2	3	2	3	3.75	27	33.75
2	3	3	5	6.25	32	40.00
2	3	4	2	2.50	34	42.50
2	4	2	7	8.75	41	51.25
2	4	3	4	5.00	45	56.25
2	4	4	1	1.25	46	57.50
2	5	1	1	1.25	47	58.75
2	5	2	4	5.00	51	63.75
2	5	3	3	3.75	54	67.50
2	5	4	2	2.50	56	70.00
3	2	3	2	2.50	58	72.50
3	3	1	1	1.25	59	73.75
3	4	2	1	1.25	60	75.00
3	4	3	3	3.75	63	78.75
3	4	4	1	1.25	64	80.00
3	4	5	3	3.75	67	83.75
3	5	2	2	2.50	69	86.25
3	5	3	1	1.25	70	87.50
3	5	4	6	7.50	76	95.00
3	5	5	4	5.00	80	100.00

Frequency Missing = 1
 IP planning aggregate

R&D with objective to license

Quality of technology management aggregate

Approximately consistent ratings across attributes