

State funding of universities and technikons 1993 to 2001

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The Education White Paper 3 of 1997 indicated that a new funding framework should replace the SAPSE subsidy formula. In March 2001 a new funding framework for higher education was proposed by the Ministry of Education. Comments on the proposal were invited. Since it is evident that the process of finalising a new funding framework for higher education has been set in motion, it is fitting to take stock of the trends in state funding of universities and technikons under the existing funding regime. The revised SAPSE subsidy formulas for universities and for technikons have been applied since 1993 to calculate subsidies for universities and technikons. The purpose of this study was to investigate trends in the funding of the university sector and of the technikon sector since the late 1980s under the SAPSE formula. This was done from a macro-economic point of view. The trends in subsidy allocations to the respective 21 universities and 15 technikons during the years 1993 to 2001 were also studied. Subsidies are generated by student enrolment figures. Therefore, in order to interpret the subsidy allocations, student enrolment trends at institutions were also investigated. It was concluded that the revised SAPSE subsidy formula has ensured stability in the funding of higher education, especially seen from a macro-economic point of view. It is, however, also evident that many institutions have experienced some instability in funding since 1993 as a result either of unrealistically high increases in student enrolments or of unforeseen declines in enrolments.

The research problem

The Ministry of Education proposed a new funding framework for Higher Education (HE) in March 2001. The Ministry invited comments on the proposal before the end of May 2001. This proposal was long overdue since Education White Paper 3 (WP3), entitled A Programme for the Transformation of Higher Education, had been published in July 1997 and indicated that a new public funding formula for higher education was imminent. According to WP3 the SAPSE subsidy formula — used since the early 1980s for the funding of universities and later, in adjusted form, for the funding of technikons — has many limitations and should be replaced by a funding framework which must increase equity in access and outcomes, improve quality and efficiency, and link higher education activities and national and regional needs more purposefully. The National Plan for Higher Education (NPHE), released by the Minister of Education in February 2001, indicated that the new funding framework would be applied for the first time in the 2003/2004 financial year.

The research leading to this paper was not intended to discuss the proposed new formula or to speculate on its final form. The purpose was to analyse student growth and subsidy allocations to universities and technikons under the SAPSE formula that has been used by the state for almost twenty years to fund universities and technikons. This paper shows that the application of the SAPSE formula, especially during the period 1993 to 2001, has led to relative funding stability in the university and technikon sectors. This stability will provide a good platform from which the new funding regime for HE could be launched.

The history of South African subsidy formulas for universities and technikons

During the last half century only three funding formulas were used in South Africa for the funding of universities. These were the Holloway formula, the van Wyk de Vries formula and the SAPSE formula. Steyn and Vermeulen (1997) gave an exposition of the evolution of these formulas since 1951. They indicated that both the van Wyk de Vries formula and the SAPSE formula retained important components of the preceding formulas, but both also introduced new features and parameters. These were dictated by the changes in the university environment during the 1960s and the 1970s. As already indicated, an adjusted version of the SAPSE formula was applied for the first time in 1987 to the then newly emerging technikon sector. The continued changes in the university and technikon sectors, and especially the high growth in student numbers during the late 1980s and early 1990s, necessitated a further revision of the respective SAPSE formulas for universities and technikons. These revised formulas were applied for

the first time in calculating subsidies for universities and technikons for the 1993/94 financial year. The former Department of National Education set out the revised SAPSE formulas for universities and technikons in two policy reports in 1992. The revised SAPSE formula for universities is also discussed by Steyn and Vermeulen (1997).

Sources of information used in this study

Apart from other specific references, the basic sources of information for this study are reports of the Department of Education (1995 and 2001), reports of the former Department of National Education (1993 and 1994) and the annual report of Statistics SA of 1998.

The subsidisation of universities and technikons under the SAPSE formula

A macro-economic perspective

Table 1 shows the state allocations to the university and technikon sectors from 1987/88 to 2001/02 in various ways. The total allocations to these two sectors in a specific year can be expressed as percentages of the total expenditure of the state on education (EE), as percentages of the total state expenditure (TE) and also as percentages of the Gross Domestic Product (GDP) of the RSA. Figure 1 shows a graph of the allocations to the two sectors separately as well as jointly as a percentage of EE, while the joint allocations to universities and technikons as percentages of TE and the GDP are shown in Figure 2.

The following trends can be deduced from Table 1, Figure 1 and Figure 2:

- The joint total state allocations to universities and technikons as a percentage of EE decreased rather rapidly during the late 1980s from 15.4% in 1987/88 to an all-time low of 11.6% in 1994/95. Since then this percentage has steadily increased to nearly 14% during the last six years of the study period.
- The universities' share of EE has declined from 12.6% in 1987/88 to about 9.0% in the mid-1990s and has since then marginally increased to a level of almost 10% in 2001/02.
- In contrast to the universities, the technikons' share has steadily increased from 2.5% in 1990/91 to over 4% in 1999/00, but has since then levelled off. This is mainly the result of the much higher increase in the number of students at technikons than at universities, especially in the early and mid-1990s.
- The total allocations to universities and technikons as a percentage of TE show some fluctuations in the earlier years, then a sharp increase and more recently some stability around 3%. The increases in the mid-1990s correlate with the increases in Figure 1 and are mainly the result of the transfer of the HE institutions in the so-called TBVC states to the SA system.

Table 1 Relative State allocations to universities and technikons according to year

Year	Sector	State allocation (R million)	% of education budget	% of total budget	% of GDP
1987/88 (1)	Universities	1159.730	12.58	2.47	0.70
	Technikons	263.071	2.85	0.56	0.16
	Total	1422.801	15.43	3.03	0.86
1988/89 (1)	Universities	1210.187	11.79	2.25	0.59
	Technikons	272.276	2.65	0.51	0.13
	Total	1482.463	14.44	2.76	0.72
1989/90 (1)	Universities	1425.777	11.85	2.24	0.59
	Technikons	334.985	2.79	0.53	0.14
	Total	1760.762	14.64	2.77	0.73
1990/91 (1)	Universities	1648.529	10.67	2.29	0.61
	Technikons	394.178	2.55	0.55	0.15
	Total	2042.707	13.22	2.84	0.75
1991/92 (1)	Universities	1775.260	10.37	2.18	0.64
	Technikons	478.158	2.79	0.59	0.17
	Total	2253.418	13.16	2.77	0.81
1992/93 (1)	Universities	1948.650	9.55	1.85	0.58
	Technikons	564.842	2.77	0.54	0.17
	Total	2513.492	12.31	2.39	0.75
1993/94 (1)	Universities	2336.518	9.87	1.87	0.55
	Technikons	692.676	2.93	0.55	0.16
	Total	3029.194	12.80	2.42	0.71
1994/95	Universities	2768.887	9.03	1.97	0.57
	Technikons	795.484	2.60	0.57	0.16
	Total	3564.371	11.63	2.54	0.74
1995/96	Universities	3066.472	9.15	2.03	0.54
	Technikons	1006.336	3.00	0.66	0.18
	Total	4072.808	12.15	2.69	0.72
1996/97	Universities	3850.804	9.22	2.19	0.61
	Technikons	1356.458	3.25	0.77	0.21
	Total	5207.262	12.46	2.97	0.82
1997/98	Universities	3975.855	9.06	2.09	0.57
	Technikons	1455.513	3.32	0.77	0.21
	Total	5431.368	12.38	2.86	0.78
1998/99	Universities	4336.687	9.71	2.15	0.58
	Technikons	1663.101	3.73	0.83	0.22
	Total	5999.788	13.44	2.98	0.80
1999/2000	Universities	4648.252	9.97	2.16	0.57
	Technikons	1896.873	4.07	0.88	0.23
	Total	6545.125	14.04	3.05	0.81
2000/2001 (2)	Universities	5001.196	9.95	2.13	0.56
	Technikons	1976.701	3.93	0.84	0.22
	Total	6977.897	13.89	2.97	0.78
2001/2002 (2)	Universities	5355.054	9.75	2.07	0.54
	Technikons	2103.760	3.83	0.81	0.21
	Total	7458.814	13.58	2.89	0.76

Total RSA Budget for 1993/94 and 1994/95 estimated from different sources.
(1) Excluding the TBVC states.

- The total allocations to universities and technikons as a percentage of the GDP were pretty stable during the study period at a level of between 0.7% and 0.8%.

The relative stability, especially since 1994/95, in the three important funding indicators reflected in the table and figures is a direct result of two important characteristics of the revised SAPSE subsidy formulas. Firstly, the formula automatically provides for cost inflation and growth in student numbers. Secondly, growth in student numbers is curbed by means of realistic restrictions on the projected student numbers used in the revised SAPSE formulas. As a result of this, large annual fluctuations in subsidy allocations to institutions, and therefore to the university and technikon systems, are avoided.

Table 2 Relative State expenditure on higher education according to country

Country	Year	HE expenditure as % of education expenditure	HE expenditure as % of government expenditure	HE expenditure as % of GNP
Congo	1996	28.0	4.1	1.7
Egypt	1996	33.3	5.0	1.6
Ethiopia	1996	15.9	2.2	0.6
Tunisia	1996	18.5	3.2	1.2
South Africa	1996	14.3	3.4	1.1
Canada	1994	35.3	4.6	2.4
U S A	1994	25.2	3.6	1.4
Argentina	1994	19.5	2.5	0.7
Brazil	1995	26.2	--	1.3
China	1996	15.6	--	0.4
Israel	1994	18.2	--	1.4
Japan	1996	12.1	1.2	0.4
India	1995	13.7	--	0.4
Singapore	1995	34.8	8.1	1.0
France	1996	17.9	2.0	1.1
Germany	1996	22.5	2.2	1.4
Netherlands	1996	29.3	2.9	1.5
Spain	1996	16.6	1.8	0.8
United Kingdom	1995	23.7	2.7	1.3
Average		22.1	3.3	1.1

Table 2 shows a comparison between South Africa and 18 other countries in the relative funding of higher education in the mid-1990s. The eighteen countries were selected to give a good representation of all the continents. The information sources used for this comparison were the Statistical Yearbooks of Unesco and the United Nations. The percentages for SA in Table 2 differ from the 1996/97 values in Table 1 since Teacher Training, which also forms part of HE, is included in Table 2 but not in Table 1. Furthermore, the Gross National Product (GNP) also differs from the GDP used as the denominator in Table 1. It is interesting to note that HE expenditure in SA, when expressed in terms of the total government expenditure and in terms of the GNP, differs little from the averages calculated for all the reported countries. The SA HE expenditure, however, expressed as a percentage of the total education expenditure, is significantly lower than the average for the nineteen countries.

Subsidy allocations to universities and technikons 1993 – 2001

Almost 90% of the total state allocation to an individual university or technikon is generated by the revised SAPSE subsidy formula. The rest of the allocation to an institution is earmarked for specific purposes. The calculation of the subsidy formula depends critically on student enrolments.

Student enrolments for a specific university or technikon, or for the two sectors in total, can be reported in various ways as will be indicated below. The suitability of a particular measure of student enrolment depends on the purpose for which the enrolment will be used.

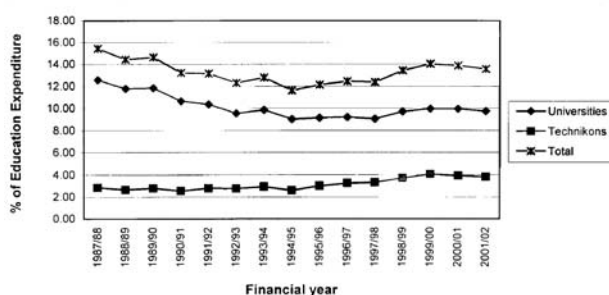


Figure 1 Total allocations to universities and technikons as a percentage of total state expenditure on education for 1987–2001

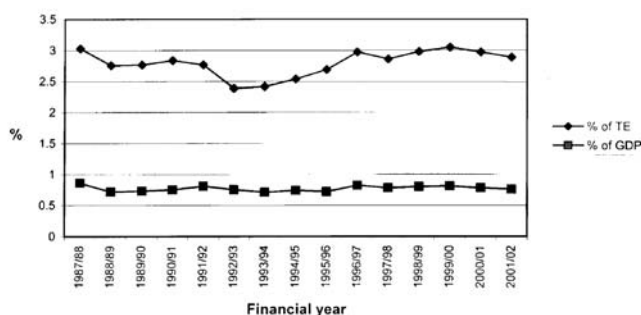


Figure 2 Total allocations to universities and technikons as a percentage of total state expenditure and of the GDP for 1987–2001

Measuring student enrolment

Headcount of students

This is the most popular way to report the student numbers of an institution for a specific year and is defined as the number of persons who have registered for one or more subjects or modules at the institution in that year. The advantage of headcount numbers is that it is readily available soon after the registration process for a specific year has been completed. However, it has the disadvantage that part-time students and occasional students are given the same weight as full-time students. Part-time students and occasional students are mostly not physically present on campus on a daily basis and are therefore not utilising the resources and infrastructure of the institution to the same extent as full-time students. It is evident that the headcount number could be a misleading figure for an institution and is a totally unsuitable basis for the allocation of state funds to institutions.

Full-time equivalent (FTE) enrolled students

In calculating the FTE enrolled students for an institution, every student's registration is weighted with the aggregated standardised credits of all the subjects/modules he/she has enrolled for in a specific year. Typically a full-time student in his/her first year will have an FTE count of about one, the exact figure depending on the subject choices. On the other hand, a part-time student's or occasional student's FTE count will be much smaller. Although the FTE enrolled student number is more difficult to calculate and usually only becomes available towards the end of an academic year, it is more suitable for the division of resources to institutions and even for the internal institutional division of resources between faculties. FTE student reporting is also internationally accepted as the best measure to use in comparing the student numbers of different institutions or comparing the sizes of higher education sectors of different countries.

Effective subsidy students (ESS)

This way of counting students forms the basis for the application of the SAPSE subsidy formula. ESS is calculated from information contained in the comprehensive SAPSE information system. This system

originated in the early 1980s at the same time as the SAPSE subsidy formula. Resources needed by institutions to perform their three main activities, namely instruction, research and public service, do not only depend on the number of FTE students, but also on the fields of study and the course levels of the enrolments. Student success rates will also influence the utilisation of resources. Furthermore, even when the enrolments are small, some base funding is needed to maintain the very costly basic infrastructure (e.g. the library) needed for the academic activities of institutions. With the FTE enrolments forming the point of departure, the ESS is a rather complex measure that incorporates all the important factors noted above. In calculating the ESS for an institution for a specific year, the average of every student's FTE count and degree credit count (sum of credits of subjects passed) is weighted according to the course level and then aggregated into two broad study fields, namely the human sciences and the natural sciences. Six hundred so-called set-up cost students are added to the human sciences' aggregate and 400 set-up cost students to the natural sciences' aggregate. This produces the ESS for Human Sciences (S_H) and the ESS for Natural Sciences (S_N). The ESS associated with students enrolled for distance education is additionally weighted by a factor of 0.67. See Venter (1985) for more information on the calculation of S_H and S_N .

Projected ESS

Since S_H and S_N are not only based on the enrolment of students in their respective subjects but also depend on information regarding their academic success in these subjects, ESS calculations for a specific year can only be finalised once all the students' examination results are available. Usually supplementary examinations are only completed early in the year following the academic year for which the S_H and S_N are calculated. The SAPSE tables from which S_H and S_N are calculated in respect of a specific academic year — say year $n-2$ — are therefore only finalised (including their auditing) three or four months into the next academic year, namely year $n-1$. This is only in time for the beginning of the state's budget planning process for the year n . The most up to date ESS information for calculating subsidies for year n is therefore information on year $n-2$. In a dynamic HE system, where every institution's student numbers are changing from year to year, it is essential to use projected values of S_H and S_N to bridge this information gap and ensure realistic subsidies. Projection formulas, based on S_H and S_N values for years $n-2$ and $n-3$, are used to project these numbers for year n . The projection formulas differ slightly between universities and technikons. For universities the projection formula for year n allows for a maximum average annual increase from year $n-2$ to year n of only 2.5% and 5% in the case of residential (contact) and non-residential (distance) ESS, respectively. The corresponding average annual increases for technikons are 6% and 8%.

The projected values of S_H and S_N form the main drivers for the revised SAPSE subsidy formula. For more information on the projection formulas for S_H and S_N for universities and technikons, the reader is referred to the two policy reports of the former Department of National Education produced in 1992.

Projected FTE students

Similar projection formulas are used for universities and technikons to project the FTE students using institutional housing (hostels) and the FTE students not using institutional housing. These two projections drive the component within the SAPSE formula that generates subsidies for the auxiliary enterprises programme (mainly hostels). The sum of these two projections for a specific institution for year n , although not used in the SAPSE formula, represents a projection of the total FTE students for that institution in year n . This is clearly a very significant number in studying FTE enrolment trends.

Student enrolment trends

The SAPSE tables from which S_H and S_N , the FTE students using

institutional housing and the FTE students not using institutional housing are calculated annually. Before submission to the Department of Education these tables are audited by the institution's external auditors. There is at present no requirement for the auditing of headcount numbers, which are also submitted annually to the Department. As already indicated, headcount numbers should not be used to analyse student enrolment trends, especially if financial planning is the purpose of the analysis. These numbers could be inaccurate and, as already explained above, also disregard the fact that part-time students consume a smaller amount of resources than full-time students do.

Although the student projections for S_H , S_N and FTE enrolments are by definition theoretical and will never equal the actual values of these respective enrolment measures in any year, they are perhaps the most useful entities to use in studying the long-term student enrolment trends in the university and technikon systems as a whole, but also in individual institutions. The reason for this is that these figures are (a) up to date, (b) smoothed, (c) based on audited SAPSE statistics, (d) sensitive to the shape and size of the institution, and (e) relate directly to subsidy allocations.

The implications of the growth in the projected student numbers on the allocation of state subsidy to institutions are usually of major interest. Subsidy reductions could not only jeopardise the efficient functioning of an institution, but also the maintaining of academic standards. In order to study student growth and subsidy allocation, the years 1993 to 2001 will be used. This period coincides with the application period of the revised SAPSE subsidy formula and this in turn therefore means that a relatively homogenous process determined the subsidies.

Student growth and subsidy allocations: university sector

Table 3 shows the projected student numbers for the university sector for the period 1993 to 2001 as well as the subsidy allocations for the respective years. Subsidies are all expressed in real terms (rand of 1995). The subsidies per (projected) FTE student, also in the rand terms of 1995, for the respective years are shown in the last column. This measure is perhaps the best indication of the funding consequences of the changing shape and size of the university sector during the period 1993 to 2001. The student numbers and subsidy amounts in Table 3 are graphically displayed in Figures 3 and 4. The following can be deduced from these presentations:

- A sharp increase of about 70 000 in the (projected) FTE students, as well as the (projected) total ESS from 1993 to about 1997. This was mainly the result of a sharp increase in S_H during these years.
- Apart from a small, but very welcome, increase of about 10 000 in S_N after 1997, all other projected student numbers remained constant until 2000.
- A decrease in the (projected) FTE enrolment numbers occurred in 2001. This is the lagged result of the unforeseen decrease in student numbers in the university system in the late 1990s.
- The subsidy allocations (in the rand of 1995) to the university system also increased rapidly from 1993 to 1997, but annual increases were only moderate since 1997.
- Apart from some fluctuations during the first 3 years of the study period, the annual subsidies per (projected) FTE student remained rather constant at about R11 000 per annum. Bearing in mind that a (projected) ESS student in the natural sciences generates more than double the subsidy of a (projected) ESS in the human sciences, the small annual increases in subsidy per FTE student since 1999 could mainly be ascribed to the relative increase in S_N .

Student growth and subsidy allocations: technikon sector

Table 4 shows similar information for the technikon sector to Table 3 for the university sector, while Figures 5 and 6 for the technikon sector are also similar to Figures 3 and 4 for the university sector.

Table 3 Projected student numbers and subsidy allocations for the university sector according to year

Year	Projected student numbers				Subsidy (Rm of 1995)	Subs/FTE (R of 1995)
	S_H	S_N	ESS= S_H+S_N	FTE		
1993	158816	68879	227695	222077	2415	10876
1994	166332	70147	236479	229918	2702	11752
1995	186061	76265	262326	256424	2710	10569
1996	196545	78640	275185	271918	3049	11214
1997	209188	80443	289632	290427	3080	10604
1998	210906	82920	293826	290113	3093	10663
1999	210469	85169	295639	295476	3170	10727
2000	211888	91352	303240	294178	3243	11025
2001	202027	91695	293722	283583	3251	11464

Table 4 Projected student numbers and subsidy allocations for the technikon sector according to year

Year	Projected student numbers				Subsidy (Rm of 1995)	Subs/FTE (R of 1995)
	S_H	S_N	ESS= S_H+S_N	FTE		
1993	50022	32669	82691	97420	656	6731
1994	51078	36127	87204	93925	735	7821
1995	61267	37774	99041	116434	856	7352
1996	64326	40314	104641	114209	1043	9132
1997	79288	43876	123164	142502	1111	7798
1998	80782	46708	127490	145119	1168	8047
1999	86244	49595	135840	165187	1257	7612
2000	86782	49789	136571	158669	1232	7763
2001	81693	51269	132963	151662	1228	8096

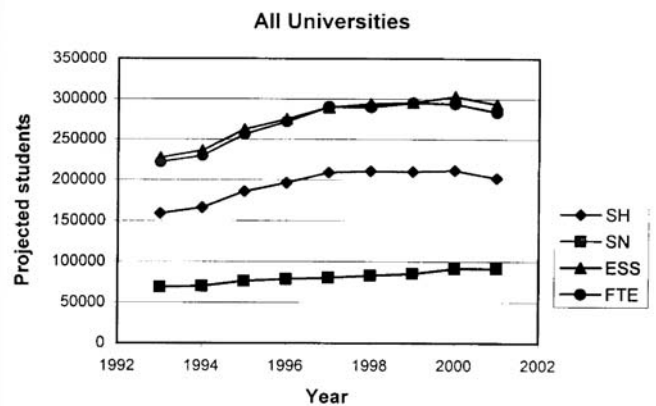


Figure 3 Growth in projected student numbers for the university system for 1993–2001

The following can be deduced from these representations:

- A rather steep increase of about 50 000 in the (projected) FTE students as well as the (projected) total ESS from 1993 to 1997. During the later years the increases were moderate.
- Similar to the university sector, the S_N to S_H ratio increased from 1999.
- Contrary to the university sector, the (projected) FTE students exceeded the total ESS annually by about 15%. This is mainly the result of a smaller ratio of postgraduate and post-diplomate students at technikons than at universities.
- As is the case for the university sector, decreases in (projected) FTE students and total ESS are also evident for the technikon sector since 2000 as a lagged result of the unforeseen decrease in actual student numbers in the late 1990s.

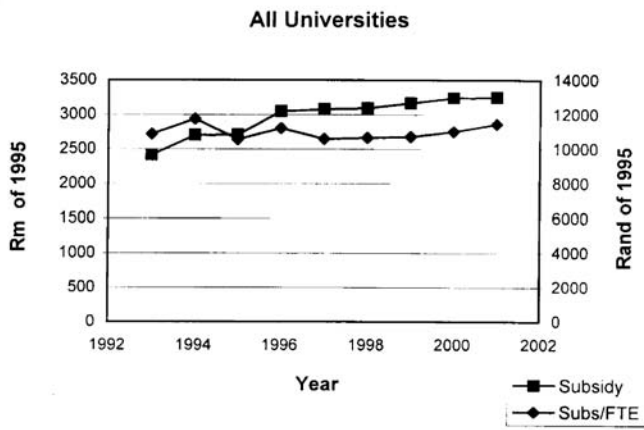


Figure 4 Subsidy per projected FTE student for the university system for 1993–2001

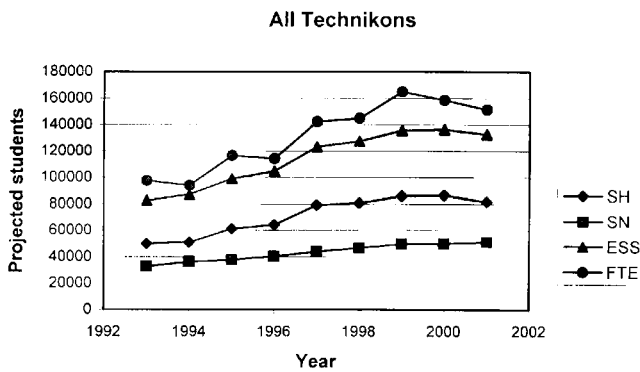


Figure 5 Growth in projected student numbers for the technikon system for 1993–2001

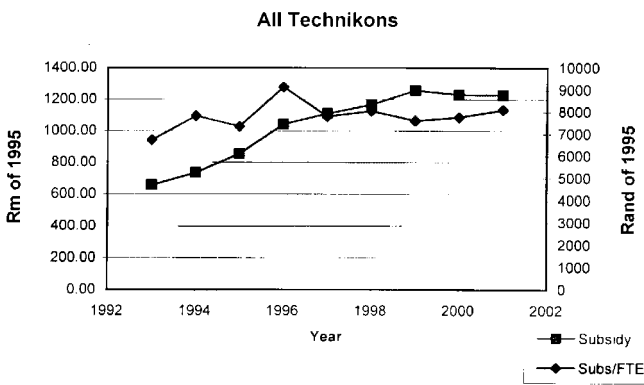


Figure 6 Subsidy per projected FTE student for the technikon system for 1993–2001

- Figure 6 indicates large increases in annual subsidy allocations (in the rand of 1995) to technikons in the period 1993 to 1999 with constant allocations since then.
- After some initial fluctuations in the subsidies per (projected) FTE student in the first half of the study period, these subsidies remained nearly constant at about R8000 per annum in the later years. Similar to the university sector, a small but significant increase in subsidy per (projected) FTE student (also as a result of an increasing S_H to S_N ratio) can be seen in the years 1999 to 2001.

Table 7 Subsidy allocation per (projected) FTE student for 2001/2002 according to institution

University	Subsidy per (proj) FTE student (R)	Technikon	Subsidy per (proj) FTE student (R)
Cape Town	24040	Border	15754
Durban-Westville	20365	Cape	15108
Fort Hare	25821	Eastern Cape	18072
Medunsa	58005	Free State	14711
Natal	21322	M L Sultan	16652
North	16549	Mangosuthu	15708
North-West	18719	Natal	14990
Free State	24661	North-West	16077
Port Elizabeth	15728	Northern Gauteng	15100
Potchefstroom	18192	Peninsula	15595
Pretoria	20065	Port Elizabeth	15318
RAU	16000	Pretoria	10878
Rhodes	20803	Technikon S A	5831
Stellenbosch	22974	Vaal Triangle	12749
Transkei	17407	Witwatersrand	15558
Unisa	7313		
Venda	16881		
Vista	10556		
Western Cape	18387		
Witwatersrand	25968		
Zululand	17280		
University sector	16943	Technikon sector	11966

Student growth and subsidy allocations: individual institutions
 Figure 7 for the individual universities and Figure 8 for the individual technikons show the trends in the different (projected) student numbers as well as the subsidy allocations in a similar way to Figures 3 to 6 above for the university and technikon sectors. Note that information for 1993 and in some cases for 1994 are not available for the institutions which were administered prior to 1994 by the so-called independent TBVC countries. Although these institutions were relatively small at the time of transfer to the SA HE system, a significant portion of the projected increases in student numbers in the university sector (see Figure 3) and technikon sector (Figure 4) for 1994 and 1995 could be ascribed to these transfers. The two graphical representations for each institution provide in some sense institutional profiles of enrolments and the resulting subsidisation for the period 1993 to 2001. These profiles can be used to roughly classify institutions into clusters of similar behaviour. These clusters, with a description of their characteristics, are set out in Table 5 for universities and Table 6 for technikons.

Heterogeneity of institutional subsidies per FTE student

Further insight into the differences in subsidies between the university sector and the technikon sector, as well as differences among institutions can be gained by considering Table 7 and the Box plots of the subsidies per (projected) FTE student for 2001 shown separately for universities and technikons in Figure 9. The non-residential institutions, namely Unisa and Technikon SA, as well as Vista (with almost one third of its FTE students non-residential (distance)), were excluded in Figure 9 to ensure better comparability. The larger variation in the subsidies per FTE student in the university sector is clearly evident and indicates more diversity in shape and size in the university sector than in the technikon sector. The obvious outlier in the university sector is Medunsa, with a subsidy per (projected) FTE student of R58 000 in 2001. The influence of the set-up cost ESS in a small institution, the overwhelming number of students in the natural sciences, a higher a value (see Table 5) and relative high enrolments in the higher undergraduate level (4th year and later) all contribute to this extremely large amount for Medunsa.

Table 5 Classification of universities according to enrolment and subsidisation profiles in 1993–2001

Cluster	Characteristics of cluster
A: Rhodes Stellenbosch Cape Town Natal Free State	<ol style="list-style-type: none"> 1. Stable increase in (projected) student numbers. 2. Stable increase in subsidy. 3. Constant subsidy per (projected) FTE student, especially since 1996.
B: Durban-Westville North Fort Hare North-West Transkei Venda Western Cape Zululand RAU	<ol style="list-style-type: none"> 1. Increase in (projected) student numbers followed by a (mostly) sharp decrease. 2. Usually an increase in subsidy followed by a decrease coinciding with the decrease in students. 3. Increase in the subsidy per (projected) FTE student, especially during the second half of the study period. <p>Note: Although the student growth profiles of the Universities of North-West and Transkei are similar to those of the other institutions in the cluster, their subsidy amounts and subsidies per FTE student were decreasing functions since these two institutions were grossly over-funded at the time of the transfer to the SA HE system. Their funding levels¹ were therefore gradually decreased after 1995 to the funding level of the other institutions.</p>
C: Pretoria Port Elizabeth Potchefstroom	<ol style="list-style-type: none"> 1. Sharp increase in (projected) student numbers, especially in the latter half of the study period. 2. Increase in subsidy. 3. Gradual decrease in the subsidy per (projected) FTE student. <p>Note: The sharp increases in student numbers at these three institutions were mainly the result of the introduction of distance education.</p>
D: Unisa Vista	<ol style="list-style-type: none"> 1. Slow increase in (projected) student numbers followed by a moderate decrease in students. 2. Slow increase in subsidy. 3. Stable subsidy per (projected) FTE student with a moderate increase in the later half of the study period.
E: Witwatersrand	<ol style="list-style-type: none"> 1. Moderate decrease in (projected) student numbers. 2. Stable subsidy. 3. Stable subsidy per (projected) FTE student.
F: Medunsa	<ol style="list-style-type: none"> 1. Moderate increase in (projected) student numbers. 2. Steep increase in subsidy, especially since 1998. 3. Steep increase in subsidy per (projected) FTE student, especially since 1998. <p>Note: Since 1998 the funding level¹ at Medunsa has been significantly higher than the level for the other universities.</p>

1. During the study period 1993–2001 the annual funding levels (a value) of the SAPSE formula used to calculate institutional subsidies were constant for all institutions apart from the exceptions indicated in this table.

Table 6 Classification of technikons according to enrolment and subsidisation profiles in 1993–2001

Cluster	Characteristics of cluster
A: Cape Northern Gauteng Peninsula Mangosuthu	<ol style="list-style-type: none"> 1. Relatively steep increase in (projected) student numbers, but levelling out during the last few years of the study period. 2. Increase in subsidy followed by constant subsidy. 3. Decreasing per (projected) FTE student, especially during the latter half of the study period.
B: Eastern Cape Free State M L Sultan Natal North-West Port Elizabeth Vaal Triangle Witwatersrand Technikon S A	<ol style="list-style-type: none"> 1. Increase in (projected) student numbers followed by a decrease towards the end of the study period 2. The subsidies followed the same pattern as the student numbers 3. After a few years of fluctuating subsidies per (projected) FTE student, a decrease in the per student subsidy is followed by a moderate increase towards the end of the study period
C: Border Pretoria	<ol style="list-style-type: none"> 1. Steep increase in (projected) student numbers with no decline 2. The subsidies followed the same pattern as the student numbers 3. Declining subsidy per (projected) FTE student, mainly as a result of large growth in distance-tuition students (Pretoria) and/or students in the human sciences

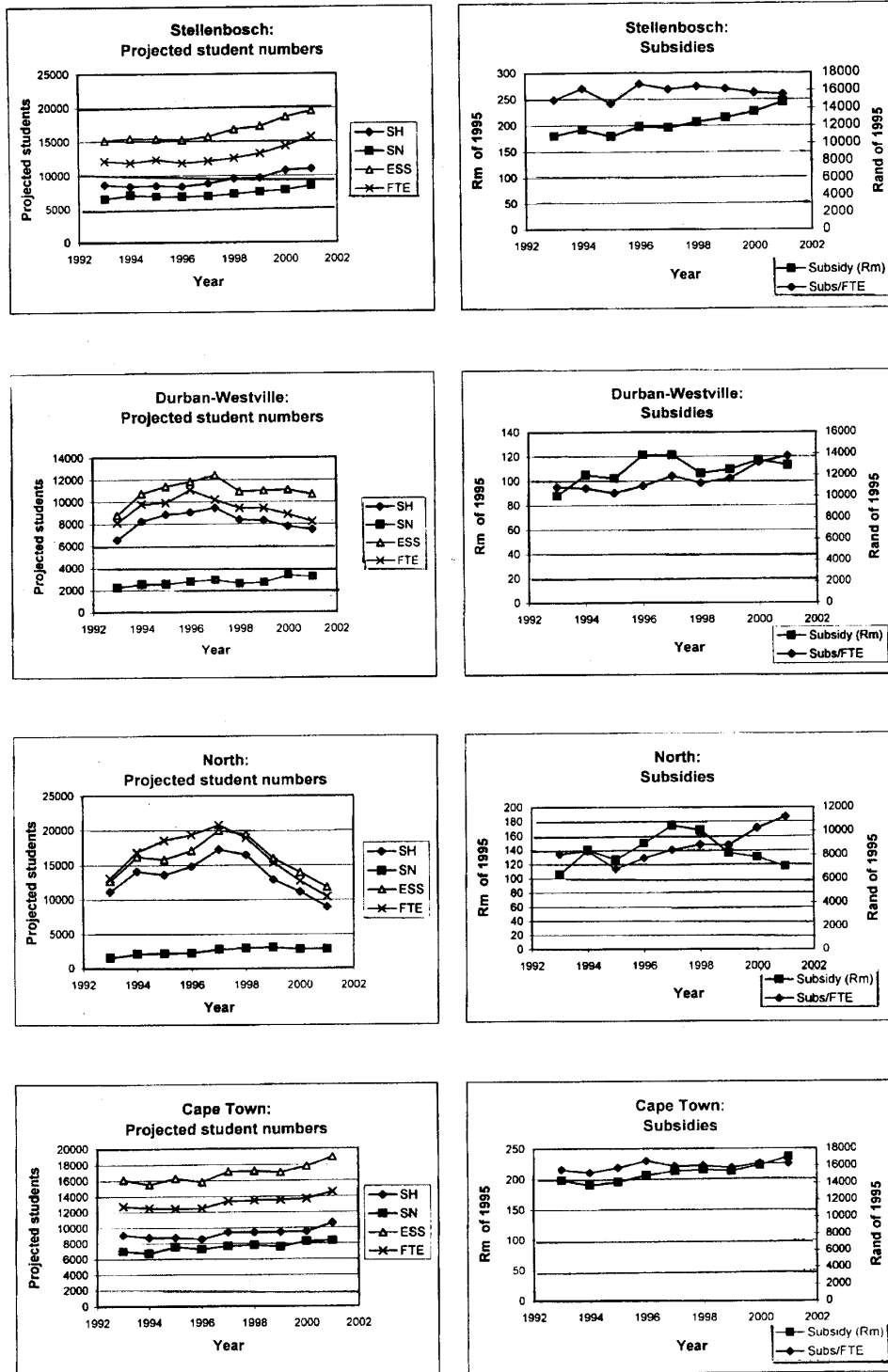


Figure 7 Projected student numbers and subsidy allocation according to university for 1993 – 2001

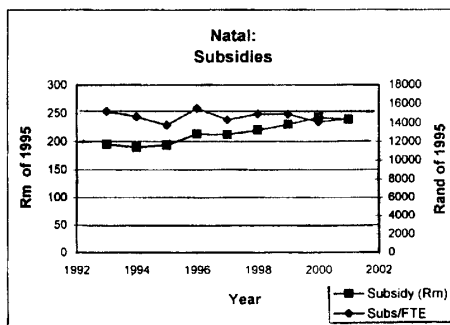
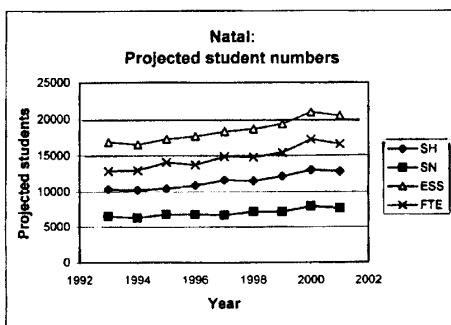
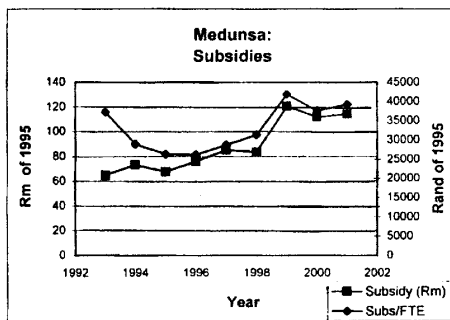
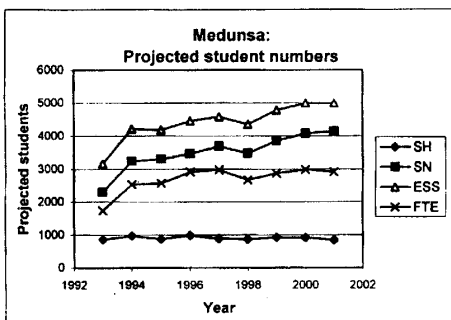
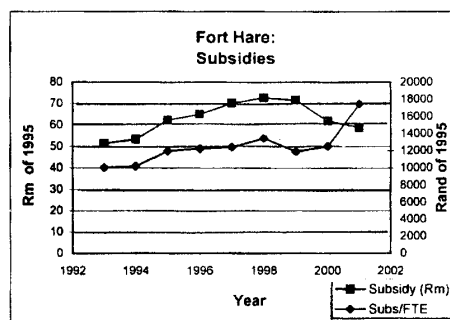
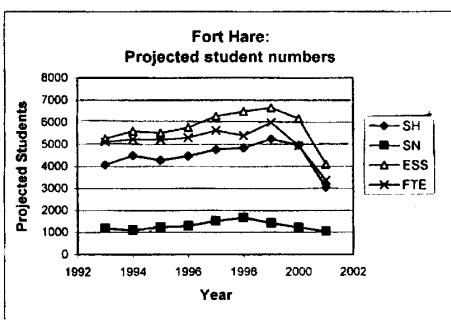
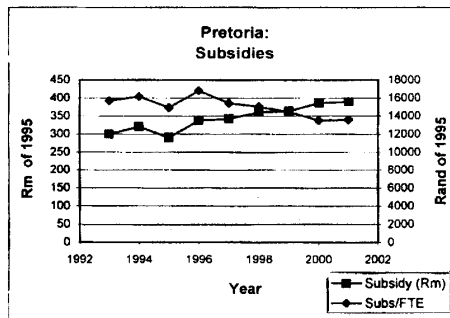
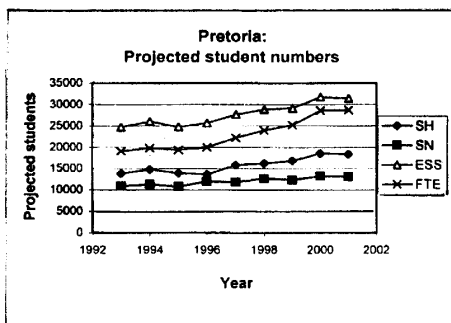


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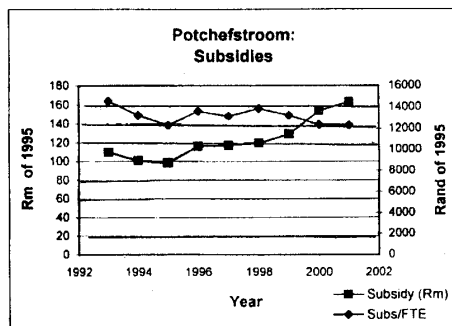
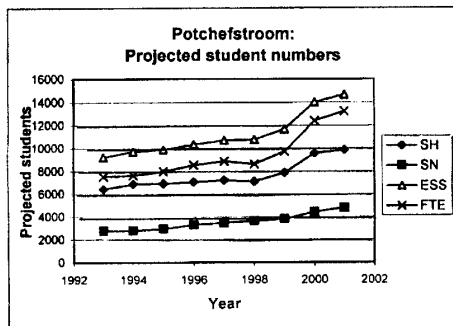
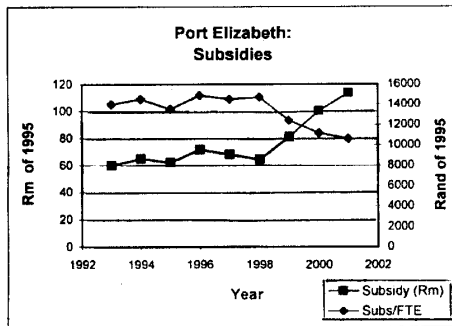
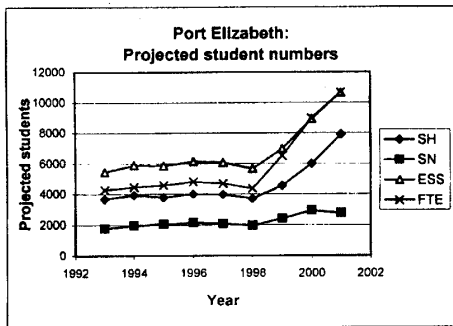
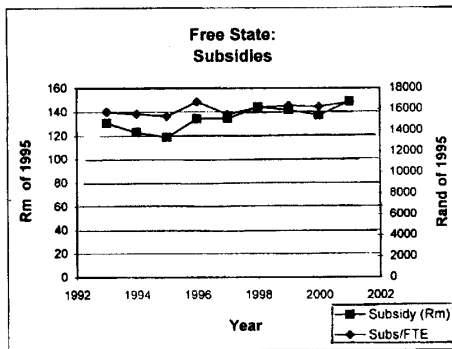
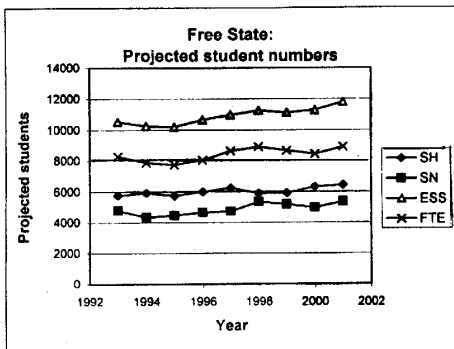
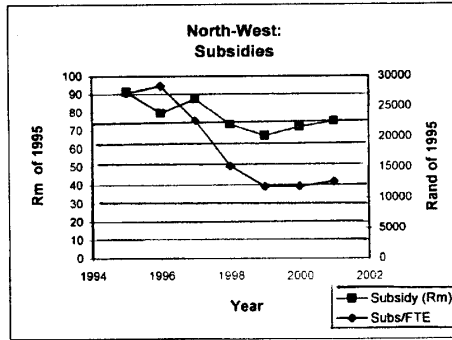
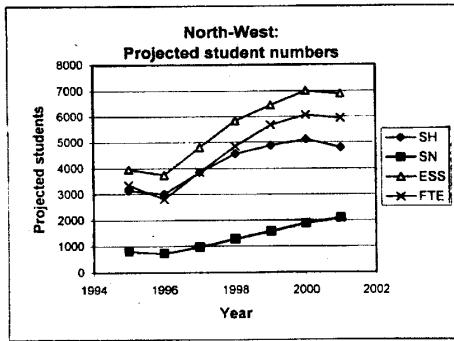


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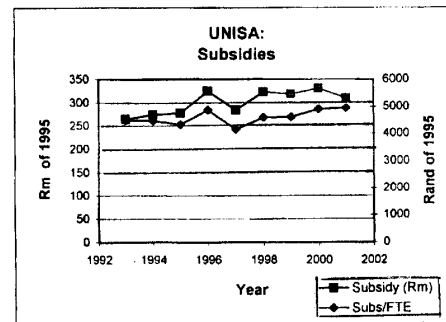
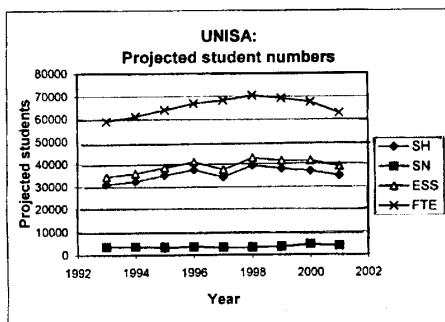
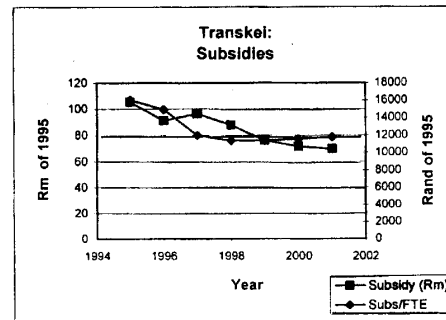
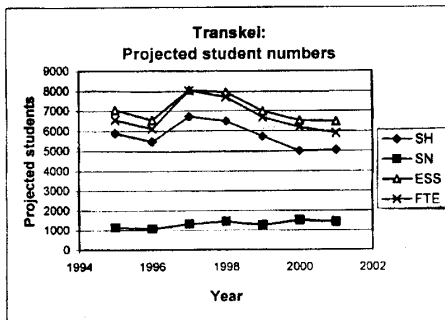
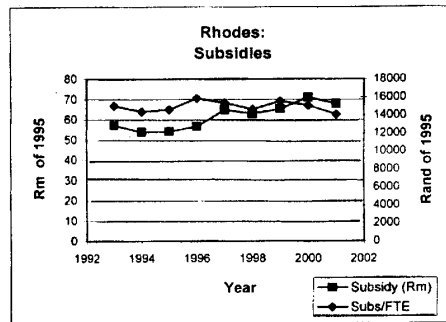
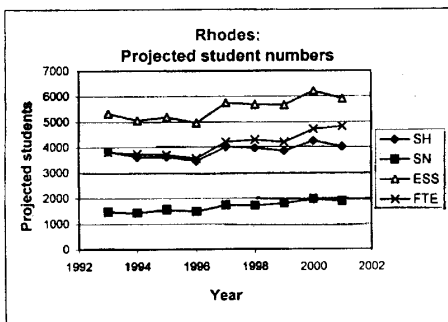
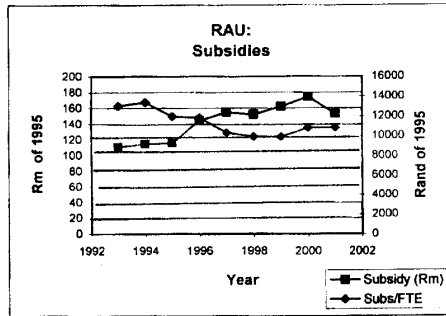
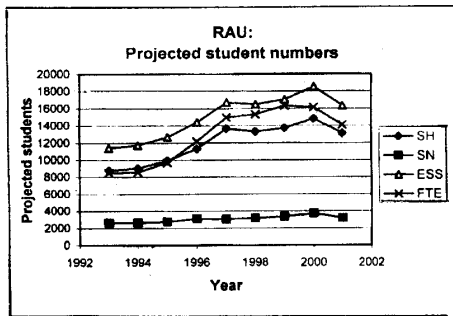


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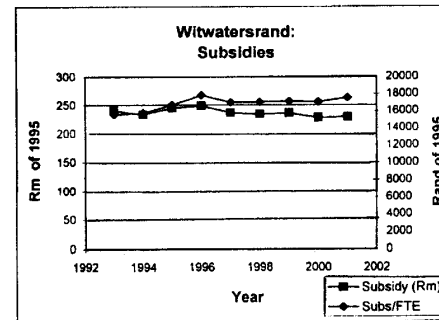
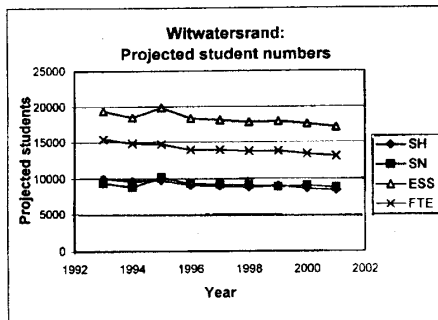
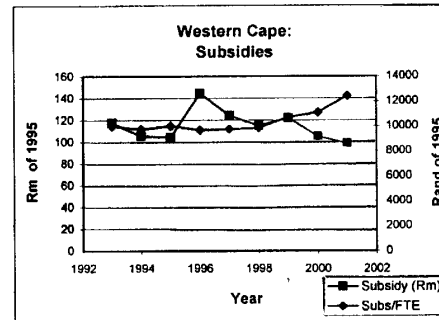
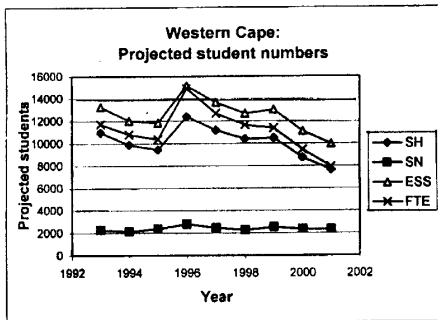
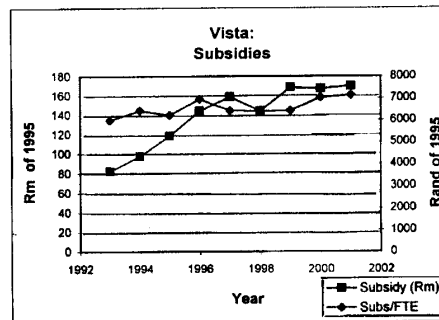
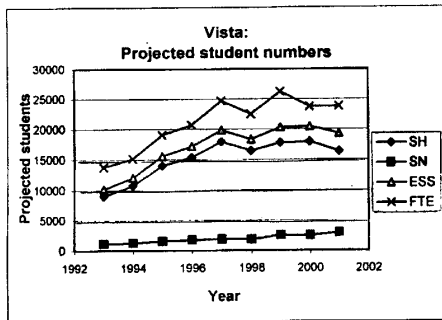
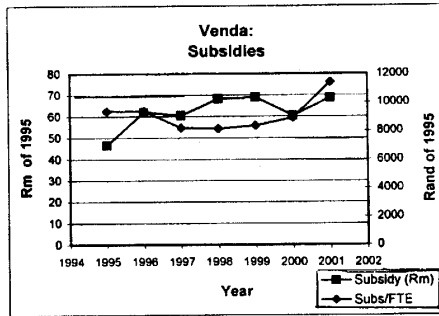
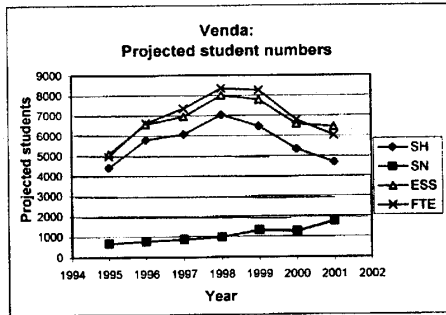


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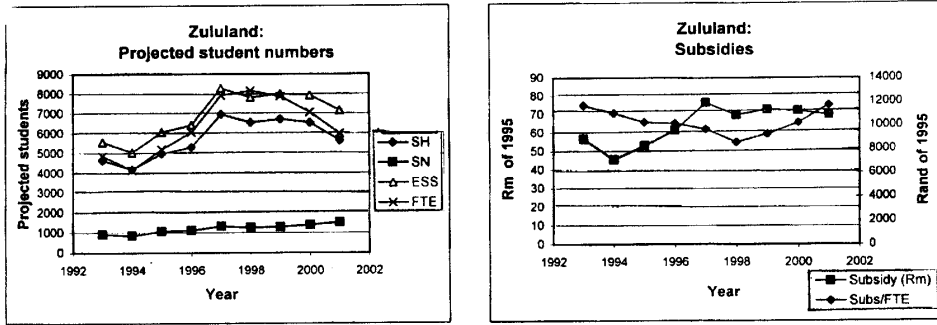


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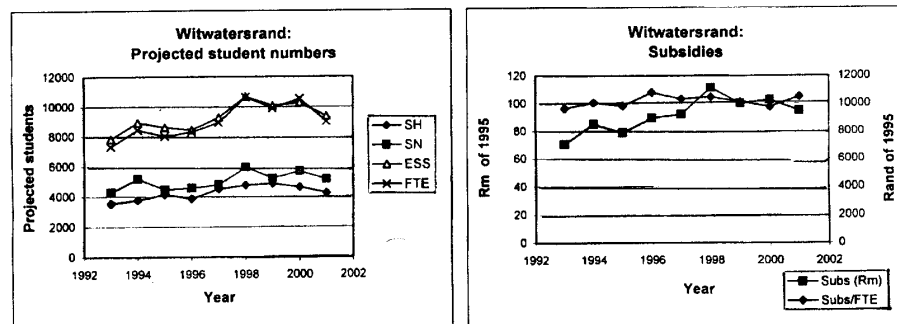
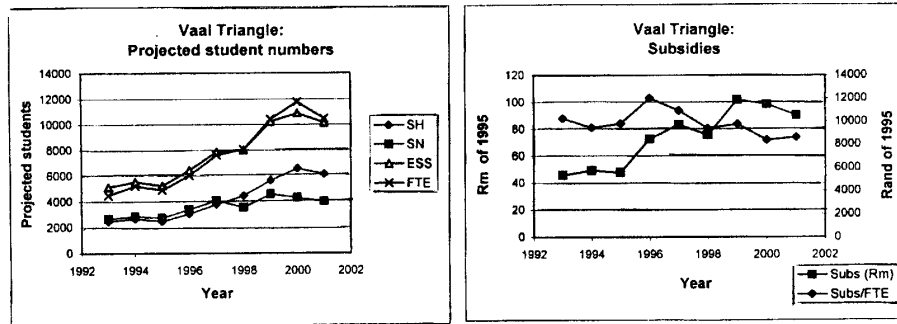
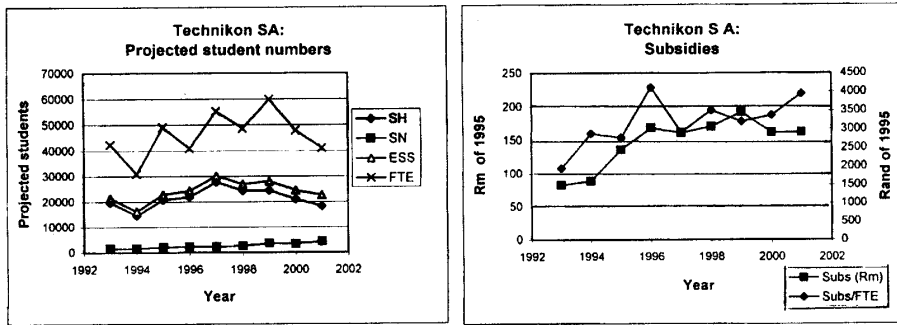


Figure 8 Projected student numbers and subsidy allocations according to technikon for 1993 – 2001

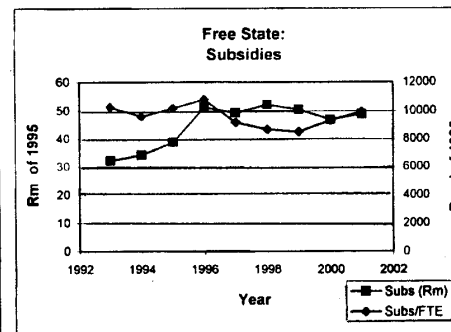
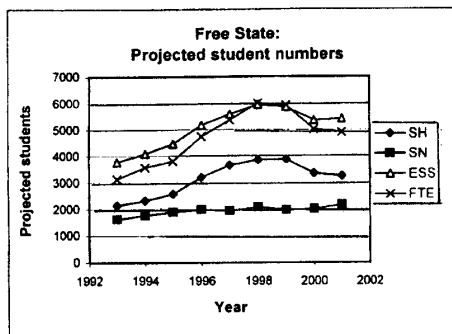
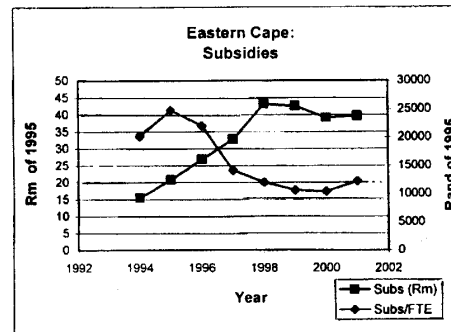
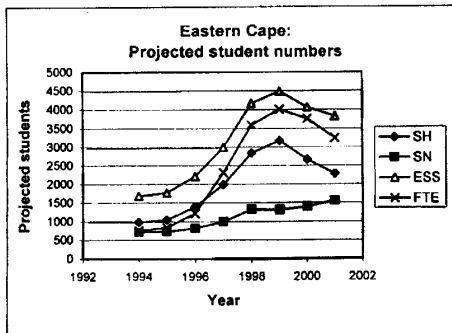
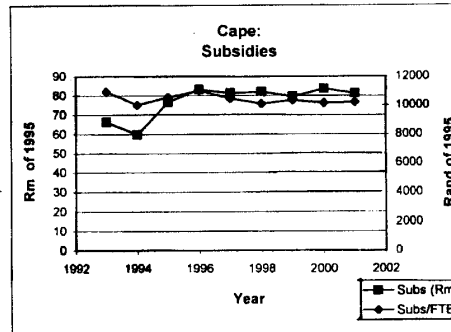
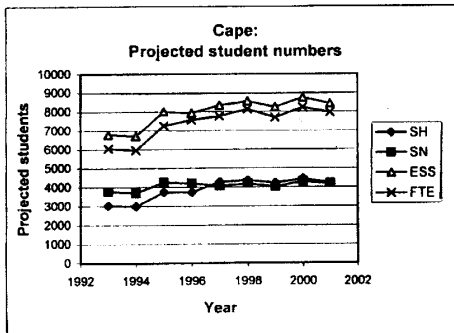
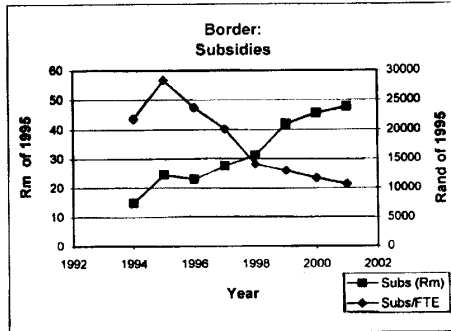
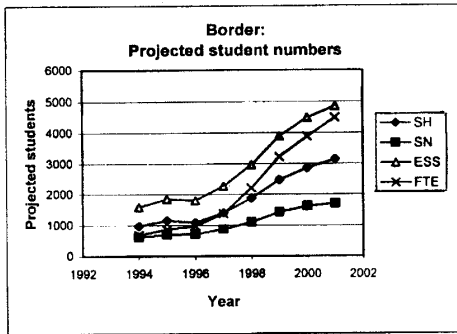


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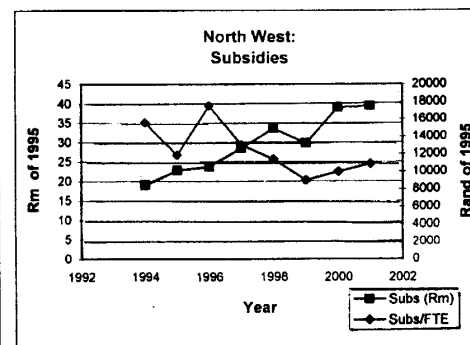
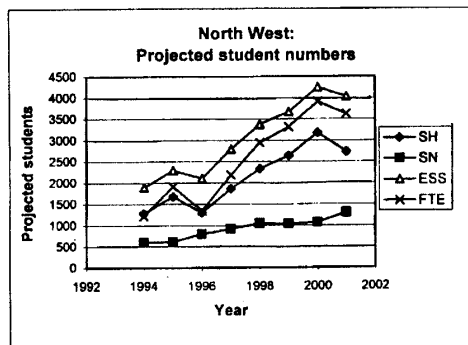
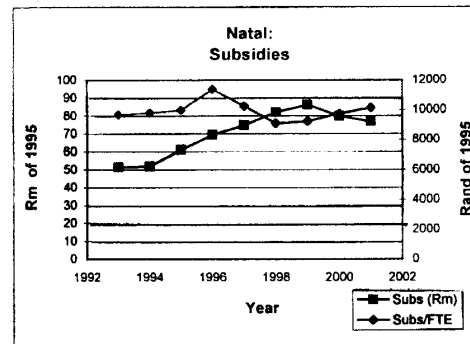
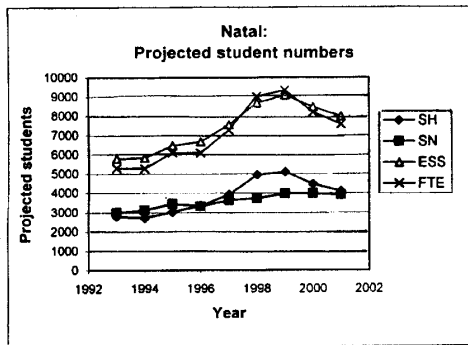
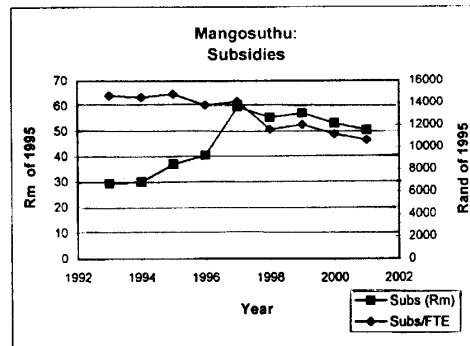
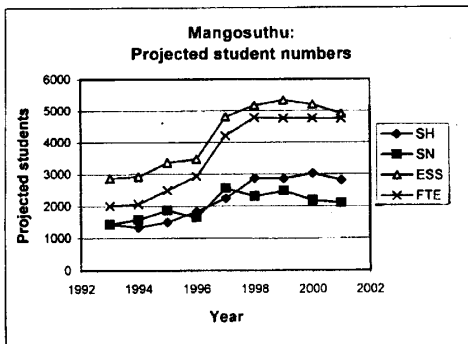
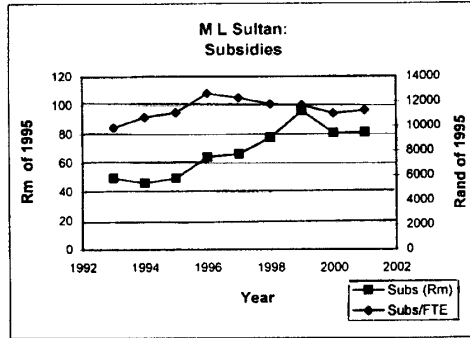
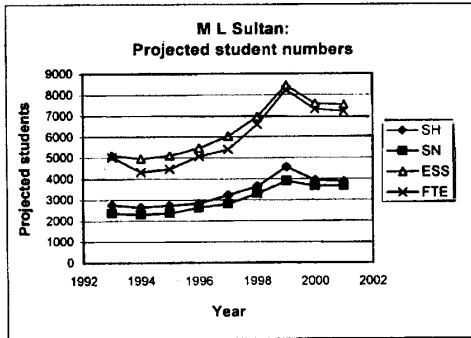


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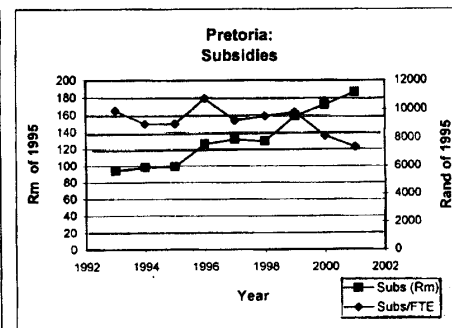
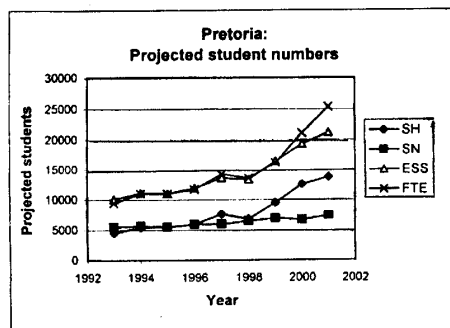
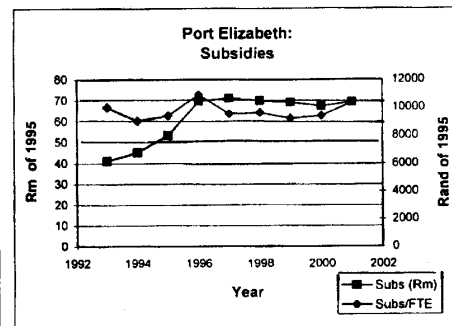
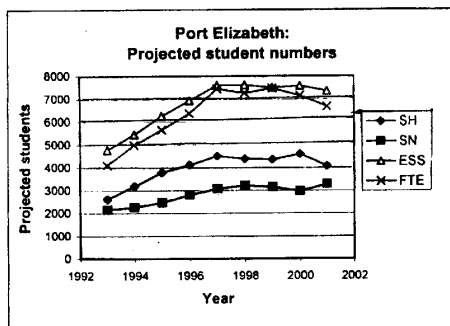
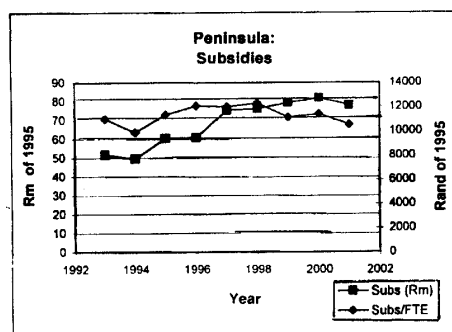
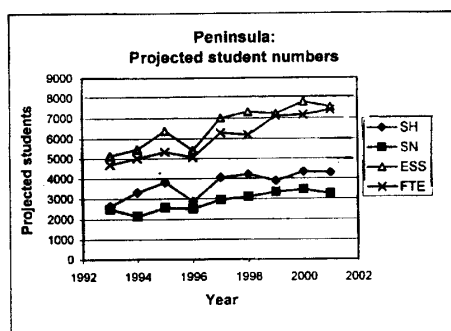
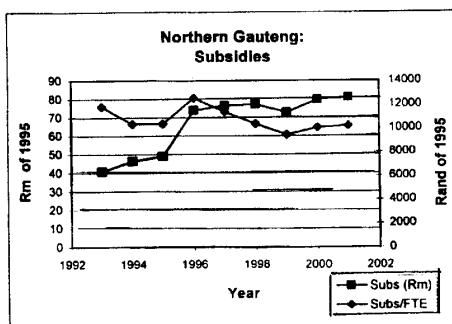
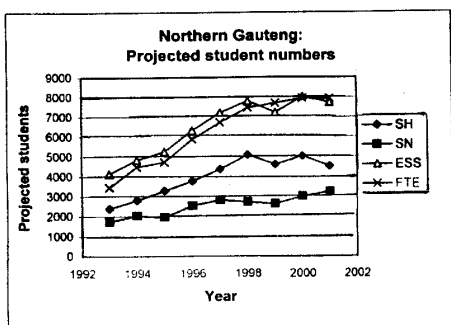


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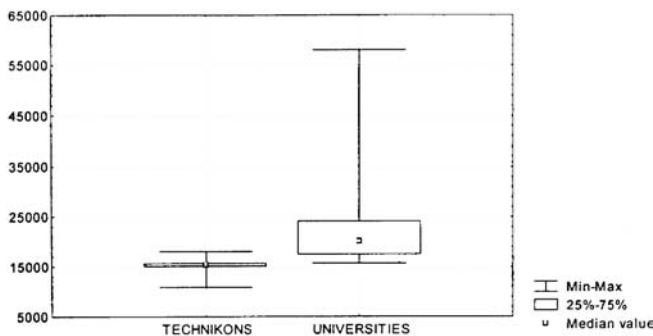


Figure 9 Box plot of subsidy (R) per (projected) FTE student for 2001 according to institution (Unisa, Vista and Technikon SA excluded)

Conclusions

Positive characteristics of the revised SAPSE formula

The last decade witnessed many passionate discussions on the positive and negative characteristics of the SAPSE subsidy formula. Some of the argumentation was educationally inspired, some politically inspired and some even inspired by mathematical and statistical considerations. Without reopening this debate, the following conclusions can be drawn when the SAPSE subsidy formula (and more specifically its revised form) is judged from the outcomes of the various kinds of analyses described above:

- Firstly, from a macro-economic point of view the SAPSE formula ensured funding stability in both the university sector and the technikon sector. This becomes obvious in studying Table 1 and Figures 1 and 2. This is especially the case from the mid-1990s onwards.
- Secondly, even on the institutional level, the latter part of the period 1993 to 2001 saw either stable or moderate increases in the real per FTE student subsidies allocated to the 36 institutions. The only exceptions are the few institutions with a consistently unrealistically high student growth rate over the past few years, usually as a result of a high intake of distance education students, who are subsidised at a lower level.
- Thirdly, Figures 4 and 6 show a substantial difference of about R3 000 (rand of 1995) in the subsidy allocations per (projected) FTE student between the university and technikon sectors. Table 7 shows that this difference was R5 000 when measured in the rand of 2001. The revised SAPSE subsidy formulas for universities and technikons are of identical form, but there are differences in some aspects, the most important being the different coefficients for the provision for research and the different values of the cost unit C_1 (remuneration of instruction/research personnel). Although these differences contribute to the fact that the subsidy per (projected) FTE student is almost 30% lower for technikons, the major difference is caused by the much higher percentage of postgraduate students at universities than postgraduate and post-diplomate students at technikons. A high percentage of postgraduate and/or post-diplomate students increases the ESS to FTE ratio and therefore the subsidy per FTE student.

Soon a new subsidy formula for HE will replace the revised SAPSE formula. In the light of the above it seems fitting to pay tribute to the outgoing SAPSE formula. This stalwart served the higher education community well over the past 20 or so years. Although far from perfect, especially in a rapidly changing academic, political and technological environment, the SAPSE formula has done its bit to assist in the safe navigation of the higher education system through the dangerous waters of political democratisation during the 1990s. Its life was extended from year to year because of a lack of something better. It is encouraging to note that the new formula proposed by government is based on many of the sound characteristics of the SAPSE formula.

Similar institutional behaviour for the period 1993 to 2001

Table 5 shows great stability in 5 universities (Clusters A and E) as far as student enrolments and subsidy allocations are concerned. Institutions in Clusters B and D show instability in growth and subsidy allocations. The reason for this was mainly the decrease in student numbers during the late 1990s. The institutions in clusters C show a sharp increase in student numbers as a result of the introduction of distance education in the mid-1990s.

Table 6 shows less variability in the growth and subsidy allocation patterns of technikons during the study period. Institutions in Clusters A and C all experienced high growth during the first part of the study period, but in the case of Cluster A stability in numbers was experienced during the past few years. The high growth rate, however, continued at Technikon Pretoria and Border Technikon. The institutions in Cluster B show unstable behaviour, namely initial growth in student numbers and subsidy allocations followed by decreasing numbers and subsidies.

In summary, assuming that both steep increases and also decreases in student numbers (with consequent unstable subsidy allocations) will lead to a number of institutional planning and management problems, it could be concluded that only 6 universities and 4 technikons experienced relatively calm waters during the period 1993 to 2001.

Closure

In February 2001 the Minister of Education indicated his intention in the National Plan for Higher Education to reduce the number of HE institutions. A National Working Group was appointed shortly afterwards to make recommendations to him in this regard. Without discussing the merits of his intention, it seems logical to state that mergers between institutions will generally enhance stability in student enrolment at institutions. This will especially be the case if some of the smaller institutions, with existing unstable enrolment patterns (as indicated in this study), are incorporated into mergers of HE institutions.

A further very pertinent question to be asked within the context of future HE planning and funding is whether the decline in FTE student enrolment numbers experienced in both the university and technikon sector over the past number of years will continue. The student enrolments at universities and technikons for the next few years will be determined by demographic trends, by Senior Certificate results, by the incidence of HIV/AIDS in the student age group as well as in their parents' age groups, and by the ability of potential students to afford higher education. Although each of these four factors requires a study in its own right, a superficial evaluation of them seems to indicate that the net effect of all these factors in the coming years could at best be that the decline in FTE student enrolments in higher education will slow down. Fewer HE institutions with stable student populations could decrease the institutional cost per FTE student and afford the opportunity to the institutional executives to plan their strategies and manage their institutions in an appropriate way.

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