



THE PRESIDENCY

REPUBLIC OF SOUTH AFRICA

DEPARTMENT: PERFORMANCE MONITORING AND EVALUATION



MPAT

Management Performance
Assessment Tool

STATISTICAL ANALYSIS OF MPAT

2012/13

1. Purpose

This Appendix presents graphs, explanations and some brief implications arising from statistical analyses of departments' MPAT scores and other data.

Section 2 below is an overview of the broad findings. The graphs are shown at the end of the document. Technical matters have been consigned to footnotes. Section 3 briefly covers data challenges, which can be improved in future.

2. Main questions, findings, and implications

Four main questions were posed for analysis:

1. How do the MPAT standards group into broader Key Performance Areas (KPA's)?
2. How do provincial departments, and national departments as a group, fare on these KPA's?
3. Do MPAT standards correlate meaningfully with important external criteria?
4. Are some MPAT standards particularly important in relation to these external criteria?

The findings are explained in the following sections.

2.1 How do MPAT standards group into KPA's?

The analysis focuses twenty-eight MPAT standards.¹ Each has four levels of proficiency: (1) non-compliance with legal/regulatory standards, (2) partial compliance, (3) full compliance, and (4) full compliance while "doing things smartly". Senior managers of every national and provincial department conduct self-assessments of the standard of the department in these twenty-eight respects. These are externally moderated to yield final scores for the standards. Since government's interest is in moving beyond compliance to performance, the statistical analysis follows DPME in grouping the first three standards in contrast to the fourth, where possible.

Figure 1 show the proportions of levels 1, 2, 3 and 4 that emerged within each standard in 2012/13, when averaged across the 155 national and provincial departments. In the figure, the first digit of the MPAT label indicates the KPA into which it was grouped by DPME, as the system was developed. The KPA's are: Strategic Management; Governance & Accountability; Human Resource & Systems Management; and Financial Management.²

¹ There are thirty-one MPAT standards. The data for two are still under development, and one (service delivery improvement) was omitted from most of the statistical analysis because it was an outlier.

² For instance, MPAT standard 3.2.2 Recruitment and Retention, falls into KPA no. 3, Human Resources and Systems.

Do these four KPAs correspond to how the MPAT standards group together as a matter of empirical fact, when used for assessment in practice, by 155 departments' senior managers? The analysis³ shows very close substantive agreement between the DPME's original four KPAs and the empirically-based solution, as tabulated in Figure 2.

It is seen that one MPAT standard, "M20: Pay sheet Certification", moved from the Human Resources to the Finance KPA. This makes sense: although this is an HR-related function, within departments it is performed by Finance. Additionally, it was found that "M04: Monitoring and Evaluation" did not relate univocally to any of the four KPAs,⁴ which could indicate that it is a cross-cutting standard that is perceived to function across all of the KPAs.⁵

2.2 How do departments fare on these KPAs?

In Figure 3 provinces, and national departments as a group, are ranked according to their scores on the four broad KPAs.⁶ This indicates the stronger and weaker areas for each. For example, the ringed point on the left shows that Gauteng's assessment on the Governance KPA was fourth- lowest. And the ringed point on the right shows that, taking an average across the KPAs, Free State was assessed fourth-highest.

An inspection of the average rankings, on the right, suggests that there are three broad "strata" on this KPA-based scoring. The top four performers are Western Cape, Mpumalanga, "National", and Free State. The bottom two performers are North West and Eastern Cape. The remaining four fall between: Limpopo, KwaZulu-Natal, Northern Province and Gauteng.⁷

The perception that provinces are the main reason for overall public-service underperformance is not generally supported by the analysis, since "National" only comes out third on average. The KPA on which "National" fares least well compared to the provinces is Strategic Management. This perhaps reflects that the concerted effort by National Treasury to strengthen strategic planning within provinces is bearing fruit. A similar support programme would be worthwhile for those national departments reporting poor performance on this KPA.

³ The technique applied was factor analysis suitable for ordinal data, with geomin rotation, using the Mplus software package. The use of dichotomised scores was also tried but did not work well in the procedure –the software reported estimation problems.

⁴ The highest of the M&E "loadings" were on Human Resource and on Strategic Management. This is substantiated in the analysis of Figure 8 below.

⁵ A fifth factor was generated by the technique, comprising secondary loadings from a few of the MPAT standards. This suggests that these particular standards could be reformulated to align to their respective KPAs in a purer way. Since it is non-specific, the fifth factor is not considered further in this report.

⁶ For simplicity, in this comparison M&E has been subsumed under strategy. We shall see in Figure 8 that although it functions as a stand-alone variable, this is the KPA with which it is most associated.

⁷ This graph is drawn on contrasting levels 1 and 2 with 3 and 4, because of the small number of 4s become volatile when broken down in such detail. But the broad the strata are retained when the contrast is levels 1, 2 and 3 vs level 4.

Since the MPAT mechanism has by now been applied twice, it can be noted how, across government, self-assessed MPAT achievement has changed. This is shown in Figure 4,⁸ showing an earlier and later vertical “bar” for each of the four KPAs. For three of the four KPAs, the right-hand bar is higher “above the line”, indicating a better proportion of scores for “compliant” and “doing things smartly”. Only the Human Resource KPA deteriorated very slightly over time.

2.3 Do MPAT standards correlate meaningfully with important external criteria?

One of the purposes of MPAT is to alert managers to achieving requirements that are important, and will be externally audited or monitored. One would therefore hope that MPAT standards would be correlated, as a matter of empirical fact, with cognate external criteria. For instance, does the assessing by managers that they have a sound Annual Performance Plan correlate with the AG’s finding that the department has clearly specified the pre-determined objectives in the Plan?

There is an enormous range of possible correlations between MPAT standards and external criteria. As an initial filter, a number of likely hypotheses were formulated by DPME for statistical testing, using mainly the Auditor General’s audit and performance requirements, but also some measures produced by FOSAD and the DPSA. Figure 5 summarises the twenty-six instances that were indeed statistically significant, i.e. where doing well on an MPAT standard predicted doing well on a particular external criterion (and vice versa!).⁹

In Figure 5 the footnote on the graph shows how to interpret each vertical pair of points. The lower ringed point shows that for those departments that were rated *low* on the MPAT standard of Annual Performance Plans, only about a quarter (26%) realised most of their performance objectives according to the AG. By contrast, the upper ringed point shows that of those departments that were rated *high* on the MPAT Annual Performance Plans standard, nearly half (46%) realised most of their performance objectives.¹⁰

Many of the correlations in the graph are between the compliance-oriented MPAT scores and *compliance-related* external criteria, such as the AG’s audit rating.¹¹ These are important in themselves. However, the additional interest of the example above is that departments well-managed enough to score well on the particular MPAT (an “input”) prove to be better at

⁸ In the earlier round self-assessments were not yet externally moderated, and 103 departments were initially covered. The comparison is therefore drawn on un-moderated self assessment, for those 103 departments only.

⁹ A full list of these hypotheses, and those discussed in ensuing paragraphs, is available from DPME, indicating which yielded significant correlations.

¹⁰ It should be remembered that, in making numerous such tests, one in twenty could be significant simply by chance (for results based on a 5% significance level).

¹¹ Unqualified with no findings, unqualified with findings, qualified, disclaimer.

achieving their *performance* targets as measured by the AG. Figure 5 reveals five more such instances, from the initial hypotheses: departments will tend to perform better than do better on their MPATs for M&E (standard M04), fraud prevention (M10), disposal management (M33), cash flow (M34), and controlling unauthorised expenditure (M36). Conversely, low MPAT assessments in these areas will tend to be associated with poor delivery of objectives, pointing to key areas for management improvement. This is an important additional benefit of the MPAT mechanism.

It was therefore decided to undertake a “scan” for correlations between the MPAT scores and a wider range of external criteria, nine in all. The outcome is summarised in matrix form in Figure 6.¹² Significant correlations are marked with one asterisk, and strongly significant ones with two asterisks.

It emerges that the AG’s audit outcome code – shown in the right-most column – is the external criterion that has the highest number of correlations with MPAT standards, some fifteen in all. Many of these MPAT standards are audit-related, so that the correlations are to be expected. But it is noteworthy that the highest correlation (.301), i.e. the strongest predictor of a good audit outcome, is with a largely independent MPAT standard M27, i.e. having a good *performance management system* in place for Heads of Departments! (This is pointed in Figure 6 by the filled arrow on the right.) And the next-highest correlation (.270) is with MPAT standard M25, having a good performance management system for the remaining levels of staff (pointed by the unfilled arrow).

The column with the second highest number of MPAT correlations reflects *senior management stability* (the proportion among DG and DDGs in office for more than three years). It is positively related to strategic plans, annual performance plans, internal audit, and good management of staff performance, cash flow and unauthorised expenditure.¹³

Interestingly, whether a department achieves its *disability target* as externally evidenced by PERSAL is the next most frequent correlation across MPATs. This possibly reflects that departments that actually focus on targets prioritised in policy are more generally better managed; and thereby that DPME is correct to emphasise achieving level 4, “acting smart” over the mere compliance of level 3.

¹² For this exercise correlation coefficients were used, rather than frequencies as in Figure 5. This allowed some of the external criteria (such as proportion of disabled) to be applied directly rather than by dichotomising them, although the approach also handles those values that are dichotomous.

¹³ This example illustrates that the correlations do not indicate the direction of causality – that must be supplied by management knowledge. In this instance, SMS stability is not a consequence, but perhaps a precondition or concomitant of the good MPAT assessment.

2.4 Are some MPAT standards particularly important, in relation to salient external criteria?

Given as many as twenty-eight MPAT standards, variously subsumed under the four KPAs (plus M&E), it would be helpful for organizational diagnosis to know whether some are *more salient* than others in relation to departments doing well on the critical external criteria. This was considered for MPAT separately in Figures 5 and 6. However, it is statistically possible to get an overall indication of the relative strengths of the MPAT standards, organised under the KPAs, guided by their contribution to predicting possible external criteria.

One approach is by a *path diagram*.¹⁴ The initial phase of this exploration is depicted in Figure 7, which is just for noting. In it, every KPA is assumed to contain all its standards, and all KPAs are presumed to be linked to each other and to a composite of external criteria (that includes the Auditor General's audit and performance scores and several other options). By contrast, Figure 8 shows the considerable simplification that results when one sets aside the inter-KPA linkages that are not statistically significant, and also standards that contribute less decisively to their KPA. Among the linkages that are retained as significant in Figure 8, the most powerful are shown by solid lines and the less powerful by dotted lines.

Firstly one may notice the prioritisation of MPAT standards, depicted by the rectangles. For instance, of those contributing appreciably to the Human Resources and Systems KPA at the bottom of the diagram, standards M21 and M25 are the strongest – recruitment and retention strategies, and performance management for levels 1-12. In other words, it is critical to find and keep good people, and manage them effectively!

Secondly, it emerges (at the far right of the diagram) that much the strongest external criterion among those examined hitherto is the AG's audit outcome. Given the predictive importance of Human Resources, the DPSA's staffing-related measures feature next. The AG's performance measure comes next. However, it is presently a simple dichotomy, and will probably fare more strongly when it is differentiated better.

Thirdly, the technique uncovers a plausible structure to the way KPAs link to each other and the external criteria, notably audit outcome. Strategy does not bear directly on it, but rather informs Governance and Finance. In turn, Governance also does not bear directly on the external criterion, but rather may be interpreted as enabling capable Human Resources. And finally it is Human Resources that is directly associated with audit outcome.

¹⁴ The technique is the partial least squares version of structural equation modelling. See Christian M. Ringle, Sven Wende, and Alexander Will, *SmartPLS 2.0 (M3) Beta*. Hamburg: <http://www.smartpls.de> (2005). It is advantageous when the available number of cases is limited (as in this instance, with 155 departments).

The situation with Finance is similar, but a bit more intricate. It does bear directly on audit outcome, but not very strongly. Its stronger effectiveness, as for Governance, is via HR. Taken in conjunction, these findings underscore the emphasis in the National Development Plan on a capable state as being central for development.

An alternative analytical perspective is provided by *multi-dimensional scaling*. It yields similar insights, as shown in Figure 9. This represents the relative strengths of the multiple correlations by proximity in a two-dimensional “map”.

The correlation structure indicates that MPAT standards are reliable in measuring the four KPA’s it was designed for. The fact that items in the same KPA tended to be placed close to each other, means that standards in the same KPA are related and measure the same area / domain of management. It also means that departments that do well on one standard within a KPA are likely to also perform well on other standards within the same KPA and that good performance in one KPA doesn’t necessarily imply good performance in other KPA’s.

The audit outcome correlated strongest with standards related to Strategic Management, Human Resource Management and Financial Management. The audit criterion of percentage of APP predetermined objectives targets met is most strongly related to the Human Resource Management standards. This finding is in line with the findings of the other statistical modelling described above.

3. Data issues and challenges

3.1 Missing data

In the second MPAT round DPME has achieved comprehensive coverage of departments, and ensured that the self-assessed scores are complete and are externally moderated to yield a final result.¹⁵ However, bringing these data into reckoning with external criteria is challenging, because these have been initiated at different times and reflect discrepant different numbers or combinations of departments. Values may be missing, either in scattered instances due to careless procedures, or when an entire department or province has missed the deadline. The former can be substituted by estimation; the latter may require the entire case to be excluded from a particular analysis.

¹⁵ An analysis of the differences between self-assessed and moderated scores is available from DPME. Unsurprisingly, in all but a couple of instances departmental managers rate themselves more highly than the externals. Departments whose scores are close to those of the externals tend to do better at realising most of their targets, on the AG’s performance measure.

3.2 The design of external measures

A deeper challenge is in the definition and implementation of measures. For instance, in reporting whether a department has met more than 80% of its pre-determined objectives, the Auditor General counts a target as missed even if it may have been largely achieved, e.g. 90,000 rather than a targeted 100,000 houses built to standard and by deadline. This could be improved by an expert-based differentiation of the scoring of such targets, and perhaps also by a weighting of their relative importance in the department's list of targets.

3.3 The indirect relation of compliance to performance

The deepest challenge of all is in the differing conception of the available measures. MPAT was primarily intended as a self-contained self-assessment mechanism with an emphasis on compliance measures, to improve management attention to such requirements. It was not intended for performance diagnosis. However, the top MPAT score, level "4", has the requirement of "acting smart", that is performance-oriented. As a result, it has emerged from the analysis that certain MPAT standards – those most relevant in representing generally better-managed departments – correlate quite strongly with better performance, using authoritative external criteria. Government has a keen interest in this extra insight from the MPAT system. Further research can help refine the definition and salience of the measures that are applied.

FIGURE 1: Distribution across Departments of MPAT scores (1,2,3, and 4), for each MPAT standard (2012/13)

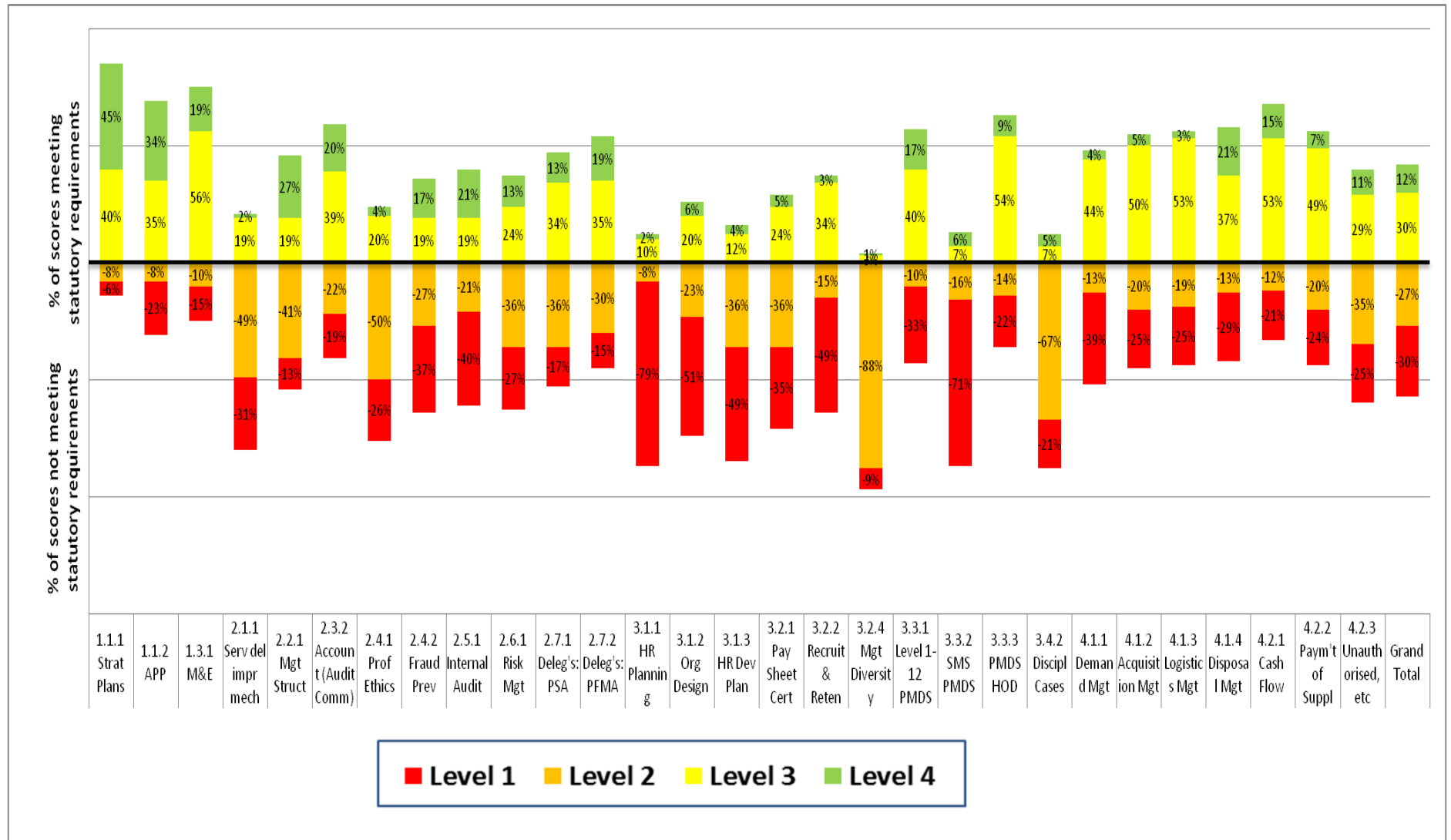


FIGURE 2: Validation of distribution of MPAT standards into KPAs

Initial DPMA schema		Schema ^a validated by data analysis	
KPA	MPAT standard	MPAT standard	KPA
Strat Mgt	M01. Strategic Plans	M01. Strategic Plans	Strat Mgt
	M02. Annual Perf Plans	M02. Annual Perf Plans	
	M04. Monit and Evaluation	M04. Monit and Evaluation ^b	
Governance and Accountability	M06. Mgt Structure	M06. Mgt Structure	Governance and Accountability
	M08. Accounts (Audit Comm)	M08. Accounts (Audit Comm)	
	M09. Professional Ethics	M09. Professional Ethics	
	M10. Fraud Prevention	M10. Fraud Prevention	
	M11. Internal Audit	M11. Internal Audit	
	M12. Rsk Management	M12. Rsk Management	
	M13. Delegations: PSA	M13. Delegations: PSA	
	M14. Delegations: PFMA	M14. Delegations: PFMA	
Human Resources and Systems	M17. HR Planning	M17. HR Planning	Human Resources and Systems
	M18. Organizational Design	M18. Organizational Design	
	M19. HR Dev Plan	M19. HR Dev Plan	
	M20. Pay Sheet Certif'n	M21. Recruit and Retention	
	M21. Recruit and Retention	M24. Mgt diversity	
	M24. Mgt diversity	M25. Level 1-12 PMDS	
	M25. Level 1-12 PMDS	M26. SMS PMDS (excl HODs)	
	M26. SMS PMDS (excl HODs)	M27. PMDS HOD	
	M27. PMDS HOD	M29. Disciplinary Cases	
M29. Disciplinary Cases	M20. Pay Sheet Certif'n		
Financial Management	M30. Demand Mgt	M30. Demand Mgt	Financial Management
	M31. Acquisition Mgt	M31. Acquisition Mgt	
	M32. Logistics Mgt	M32. Logistics Mgt	
	M33. Disposal Mgt	M33. Disposal Mgt	
	M34. Cash Flow	M34. Cash Flow	
	M35. Payment of Suppliers	M35. Payment of Suppliers	
	M36. Unauthorised Exp etc	M36. Unauthorised Exp etc	

^a A fifth, non-specific factor contained secondary loadings of a few MPAT standards. See footnote 5.

^b M&E emerges as a cross-cutting variable.

FIGURE 3: Ranking of provinces and aggregated national departments on KPA-indices

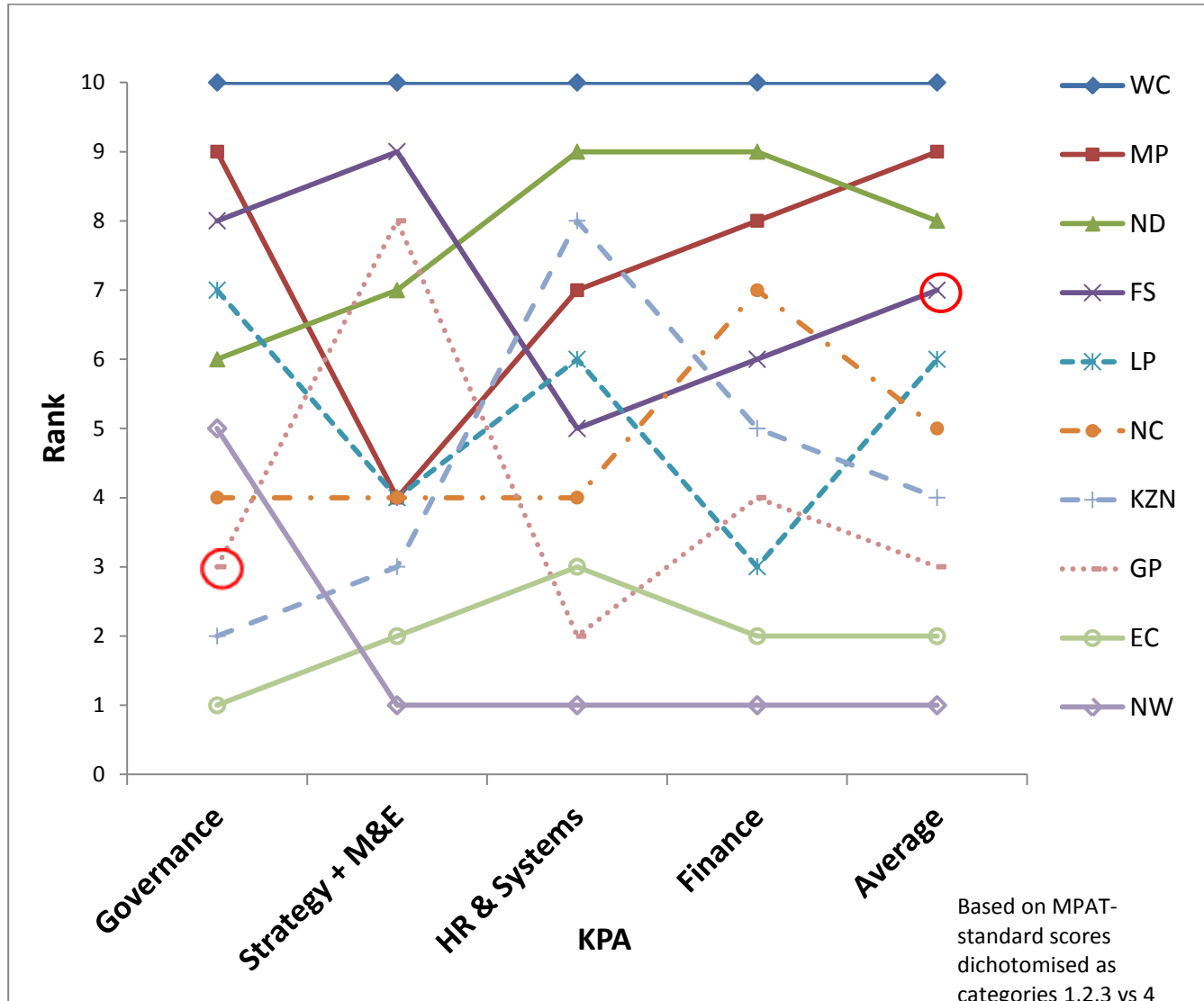


FIGURE 4: Self-assessment MPAT 2011/12 vs 2012/13 for departments that completed both assessments

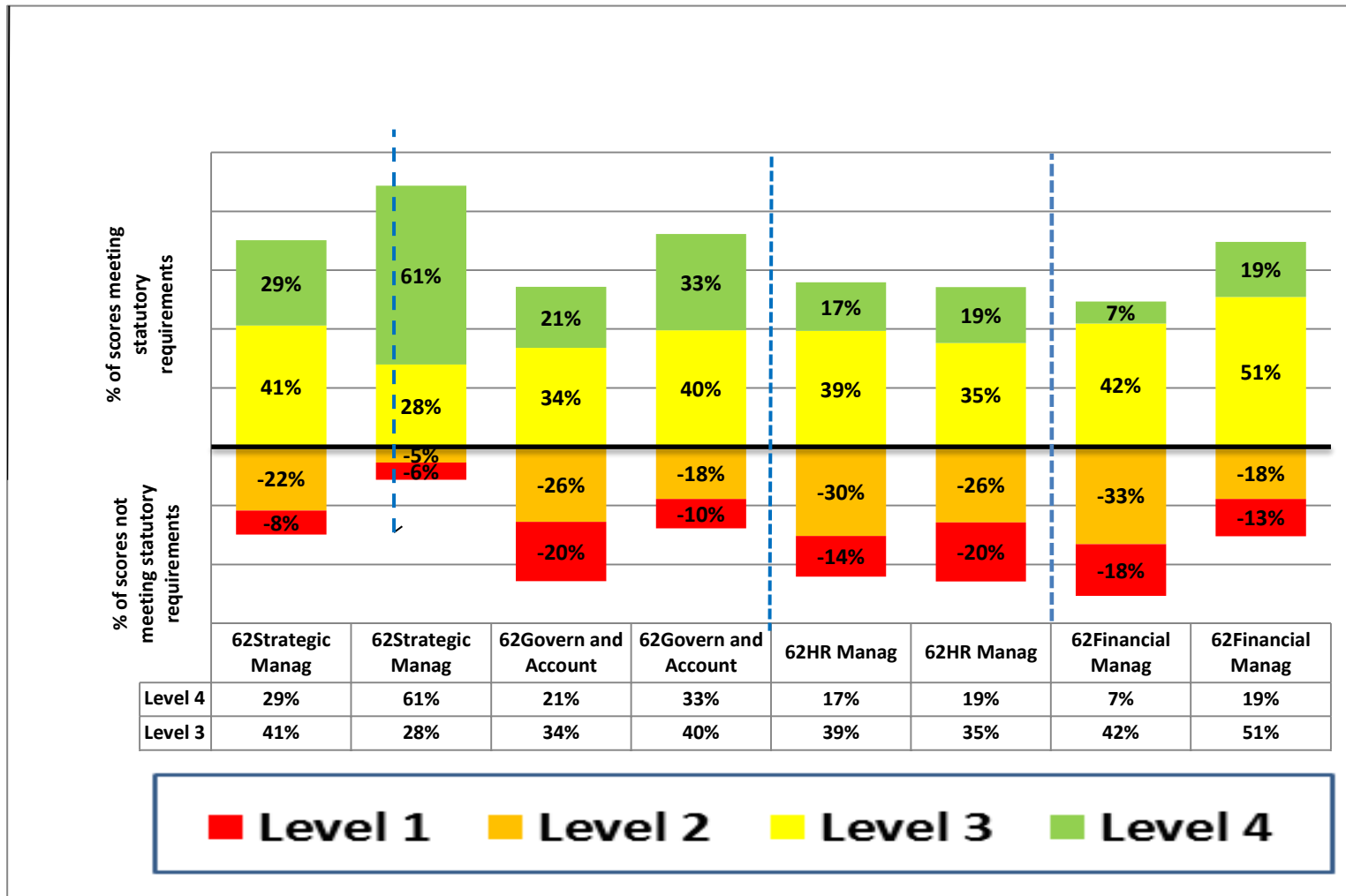


FIGURE 5: Scores on external criteria (in %) for Departments showing low or high MPAT compliance standards

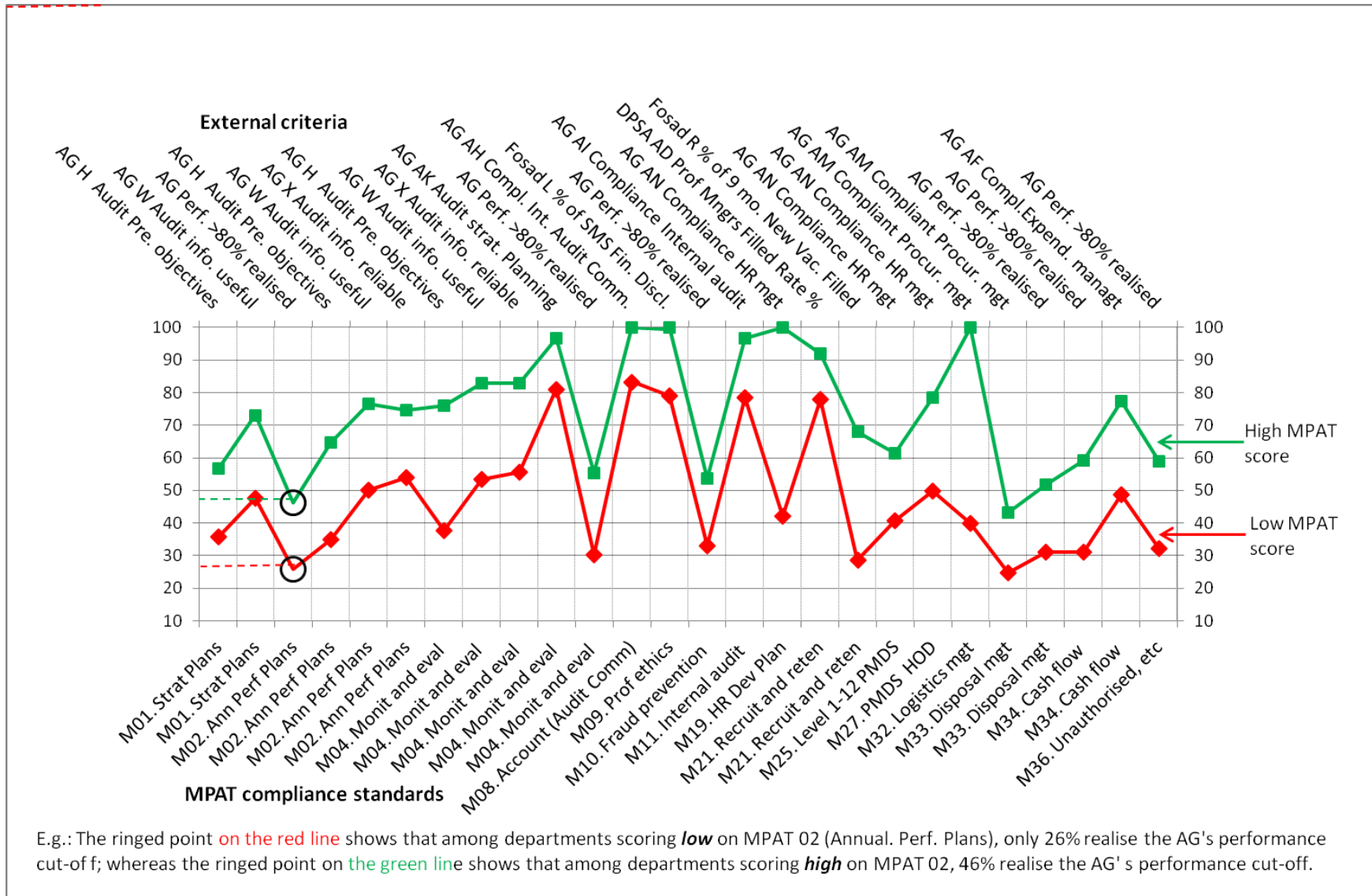


FIGURE 6: Significant correlations for low/high MPAT scores (1,2,3 vs 4) Ms against several extra external criteria

	SMS fin. disclos. With OPSC	dichot.< 20% targets reached	Under/over spend	Vacancies line managers	SMS Vacancies Prog1	Disabled prop'n	DG/DDG in job > 3 years	SMS Prog1 in job > 3 yearsgt3	Female diff. from 50% target	2011-12: Audit outcome code
M01. Strat Plans	-.049	-.192**	-.054	-.013	-.100	.010	.249**	.212**	-.072	.146*
M02. Ann Perf Plans	-.097	-.081	-.033	.021	-.207**	.004	.268**	.062	.038	.226**
M04. Monit and eval	.304*	-.243**	-.171*	.075	.014	.054	.056	.026	-.156*	.188*
M08. Account (Audit Comm)	.147	-.157*	-.053	.016	.048	.152*	.128	-.063	.057	.201**
M09. Prof ethics	.139	-.036	-.042	-.064	.022	.025	.066	-.062	.036	.185*
M10. Fraud prevention	.275*	-.202**	-.071	-.134	-.012	.096	.100	-.054	.048	.150*
M11. Internal audit	.191	-.039	-.059	.022	-.045	.263**	.279**	.050	.123	.239**
M12. Rsk management	-.198	.056	-.063	.052	.067	.182*	-.028	-.082	.039	.093
M14. Delegations: PFMA	.199	.042	-.052	-.054	-.061	.146*	.098	-.065	.213**	.094
M20. Pay sheet cert	.109	-.012	-.110	.096	.227**	.048	.081	.053	.069	.144*
M21. Recruit and reten	.164	-.052	-.065	.008	.107	.165*	.074	.086	-.114	.057
M25. Level 1-12 PMDS	.230	-.092	-.063	.128	-.012	.007	.183*	.010	-.031	.270**
M26. SMS PMDS (excl HODs)	.139	-.050	-.044	.038	-.137	.167*	.194*	-.050	.151*	.149*
M27. PMDS HOD	.161	-.101	-.092	-.040	-.128	.145*	.136	.074	.086	.301**
M31. Acquisition Mgt	.135	-.012	-.087	.097	.058	.102	.007	-.025	-.011	.144*
M33. Disposal mgt	.125	-.157*	-.100	.028	.073	.014	.109	.017	-.073	.205**
M34. Cash flow	.045	-.210**	-.076	-.015	-.024	.237**	.250**	.050	-.089	.226**
M35. Payment of suppliers	.146	-.007	-.103	.054	-.055	.273**	.087	-.030	.037	.076
M36. Unauthorised, etc	-.003	-.179*	-.053	.142*	.015	.203**	.203**	.106	-.029	.170*
MPATSAFinDiff	.017	.137*	.024	-.026	.000	-.019	-.076	.067	-.089	-.071

** . Correlation is significant at the 0.01 level

* . Correlation is significant at the 0.05 level

No signific. results	MD06 Mgt struct M17. HR Planning M18. Org Design M19. HR Dev Plan	M24. Mgt diversity M29. Disciplinary cases M30. Demand Mgt M32. Logistics mgt
----------------------	--	--

FIGURE 7: All possible links among MPAT standards (yellow rectangles), KPAs (blue circles), and criterion variables

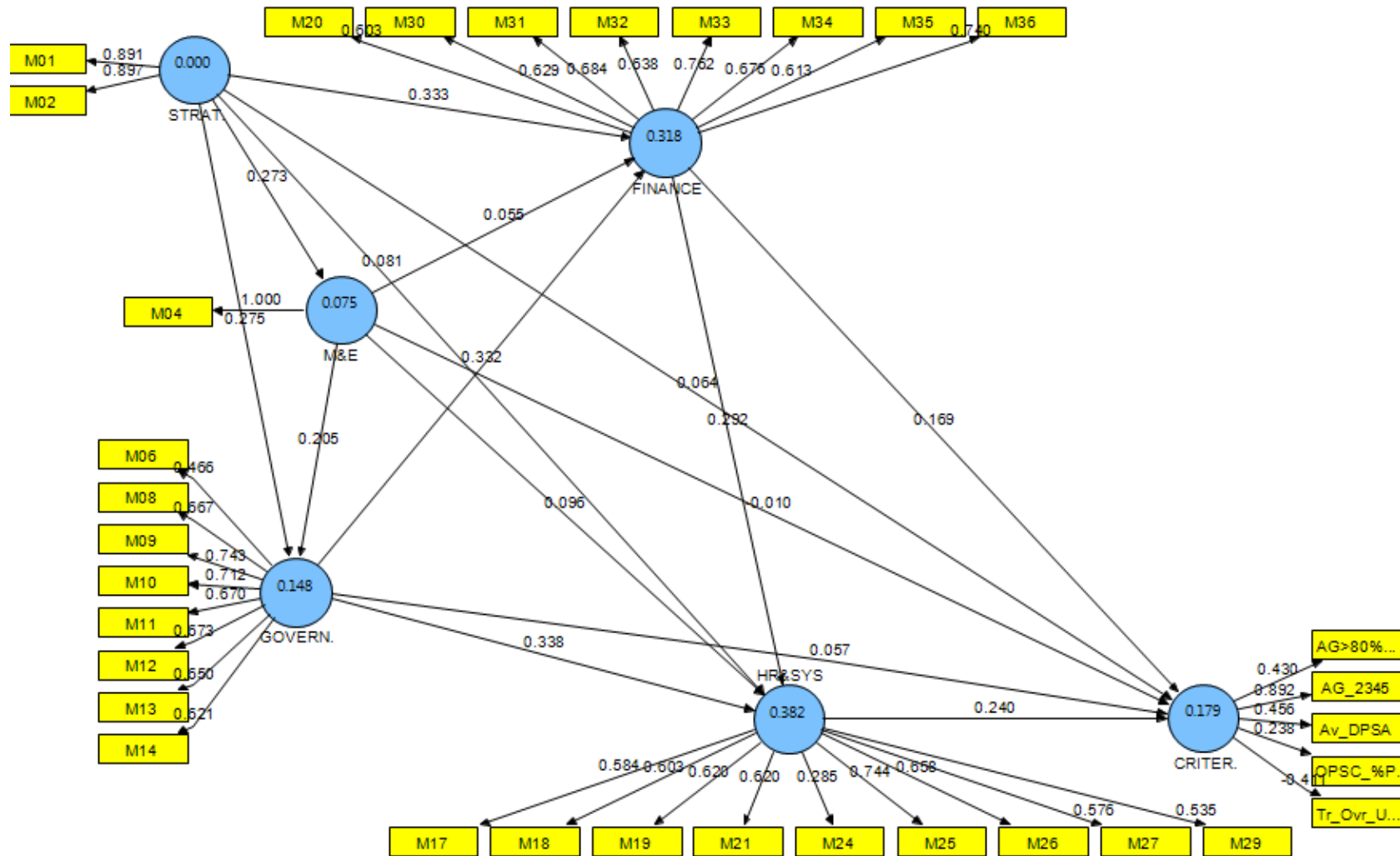
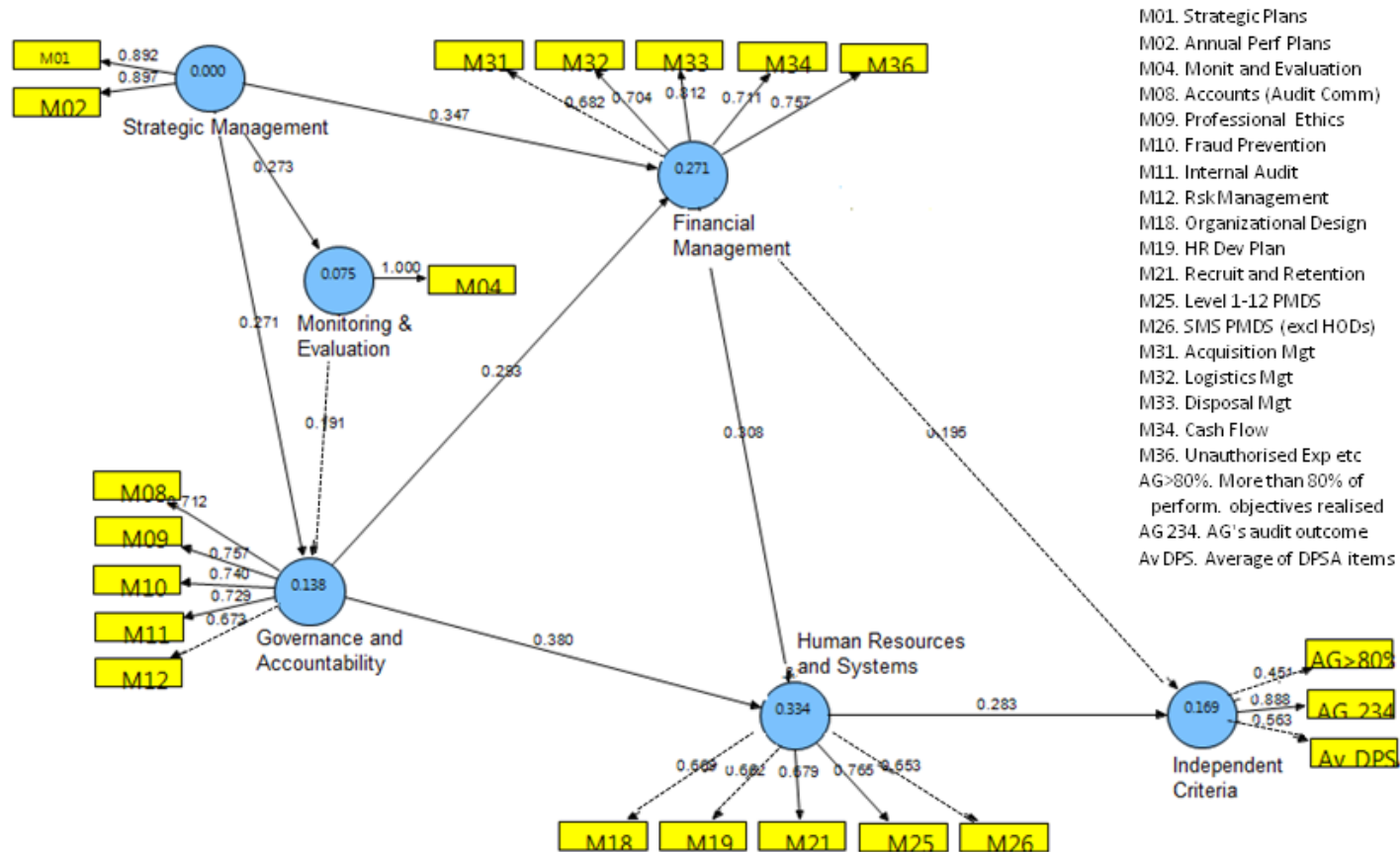
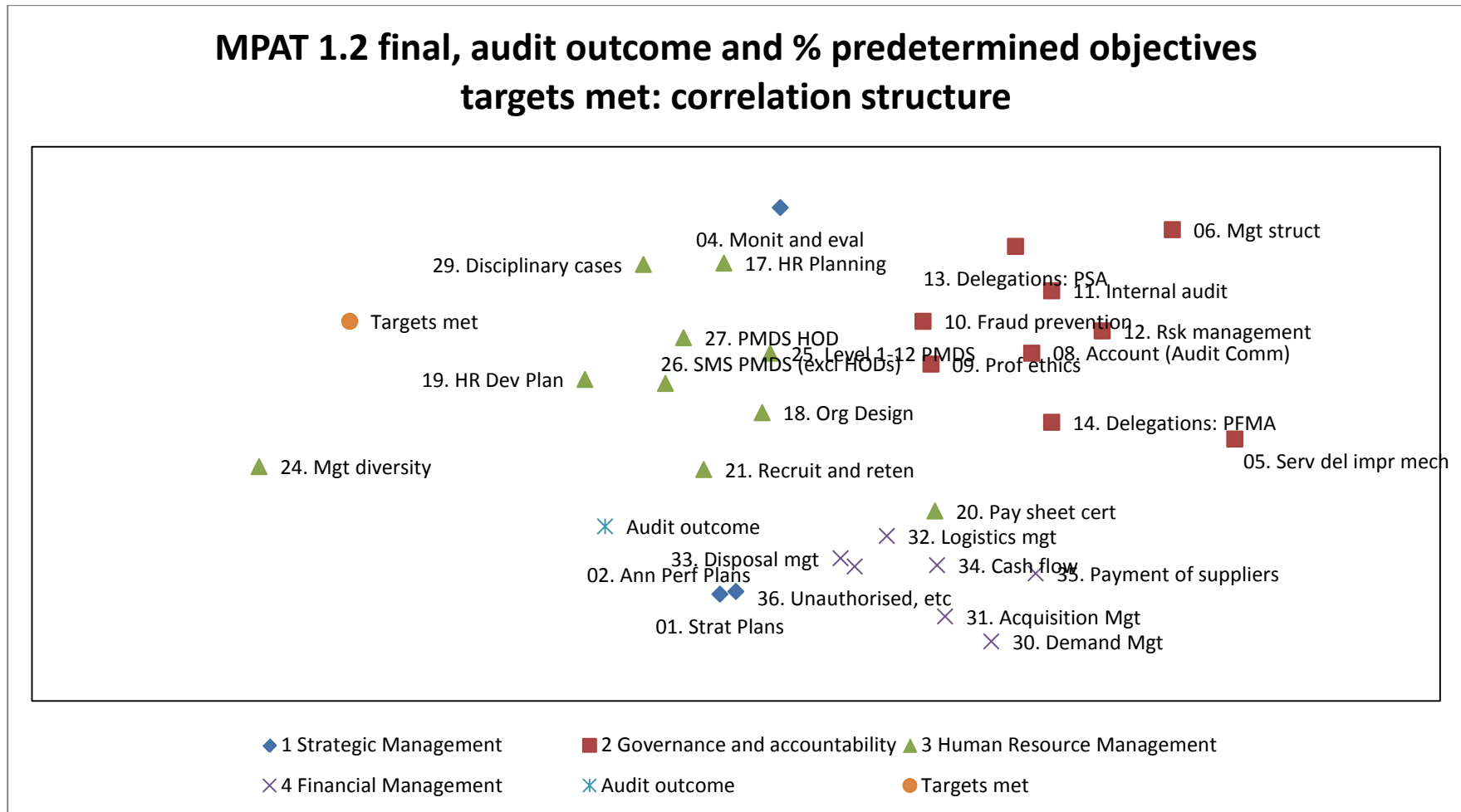


FIGURE 8: Simplified relations among reduced number of MPAT standards, KPAs, and remaining criterion variables



Note: Dotted links between factors/KPAs (blue circles) represent weaker links, $.01 < p < .05$.
 Dotted links from variables/MPAT standards (yellow rectangles) represent relatively weaker Bs, $.6 < B < .7$

FIGURE 9: Two-dimensional “map” of relationships and correlation among standards, KPAs, and criterion variables¹⁶



¹⁶ This **multidimensional scaling** provides a 2-dimensional scatterplot representing 29 MPAT standards (including service delivery improvement), the audit outcome and the achievement of predetermined objectives (PDO). The points are placed in such a way that the closer two points, the stronger their correlation. Items which are far apart are not correlated.