



UPM
UNIVERSITI PUTRA MALAYSIA
BERILMUBERBAKTI

PUTRA
PERTANIAN UNTUK RAKYAT

DIGITAL BEST PRACTICES



Berilmu Berbakti Pertanian • Inovasi • Kehidupan

Domain IV : Mengurus Fungsi Audit Dalam (*Principle 10*)

Standard 10.3 : Penggunaan Teknologi

Fungsi audit dalam hendaklah menggunakan teknologi bagi meningkatkan keberkesanan dan kecekapan pelaksanaannya. Ketua Audit Eksekutif (CAE) perlu:

- Memastikan fungsi audit dalam mempunyai teknologi yang menyokong proses audit dalam; dan
- Menilai secara berkala teknologi yang digunakan oleh fungsi audit dalam serta meneroka peluang untuk meningkatkan keberkesanan dan kecekapan.

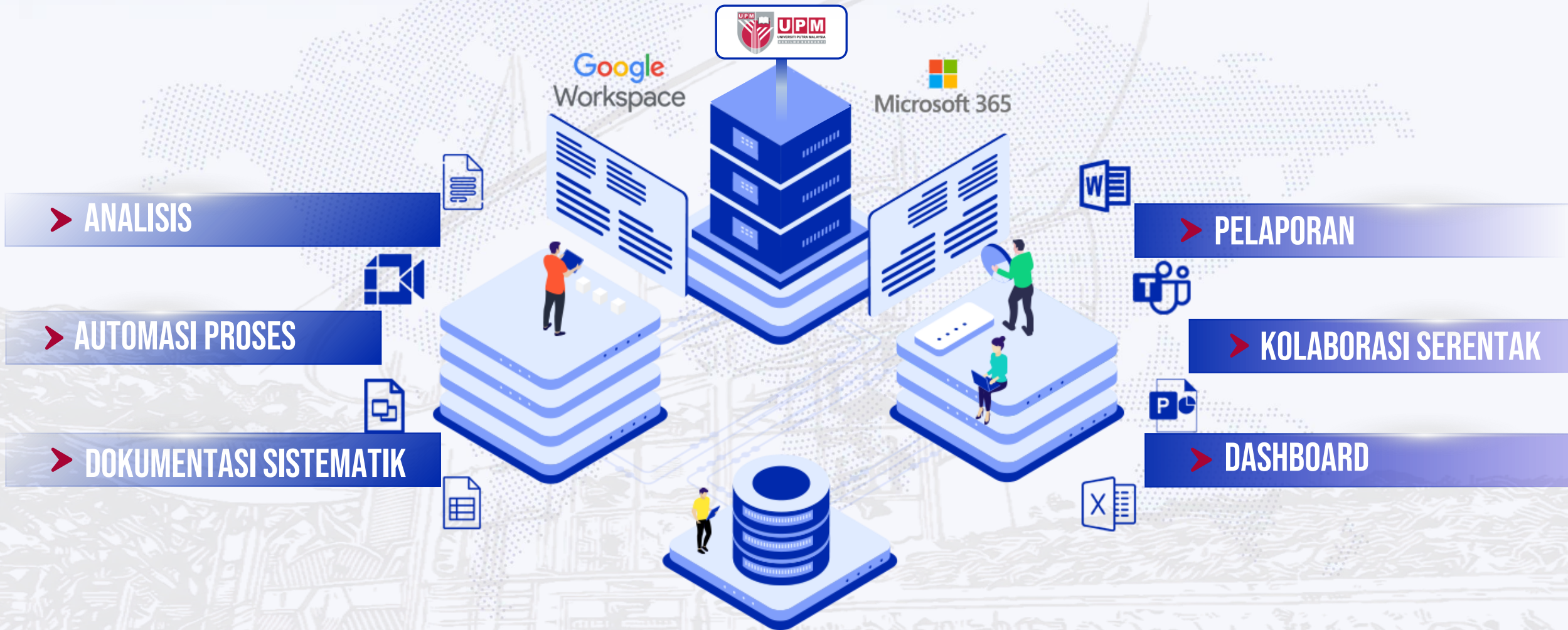
Contoh Evidence of Conformance:

- a) Dokumen yang menerangkan inisiatif semasa atau yang dirancang untuk menggunakan teknologi bagi memajukan objektif fungsi audit dalaman;
- b) Rekod pelaksanaan teknologi, latihan dan penggunaan teknologi, termasuk kertas kerja audit yang menunjukkan penggunaan teknologi semasa pelaksanaan tugas audit.



Mencipta - Melindungi - Mengekalkan

ADAPTASI PERUBAHAN TEKNOLOGI



CARA MEMANFAATKAN TEKNOLOGI SEDIA ADA



**CARA KERJA
BAHARU**



**RUANG
KOLABORASI**



**TEMPAT KERJA
DIGITAL**



**RUANG KREATIVITI
DAN
PENYELESAIAN
MASALAH**

KEPERLUAN TRANSFORMASI DIGITAL DALAM AUDIT

1.

Peningkatan
Penggunaan Data
Dalam Operasi
Universiti

2.

Keperluan Audit
Yang Lebih Pantas
Dan Berasaskan
Data

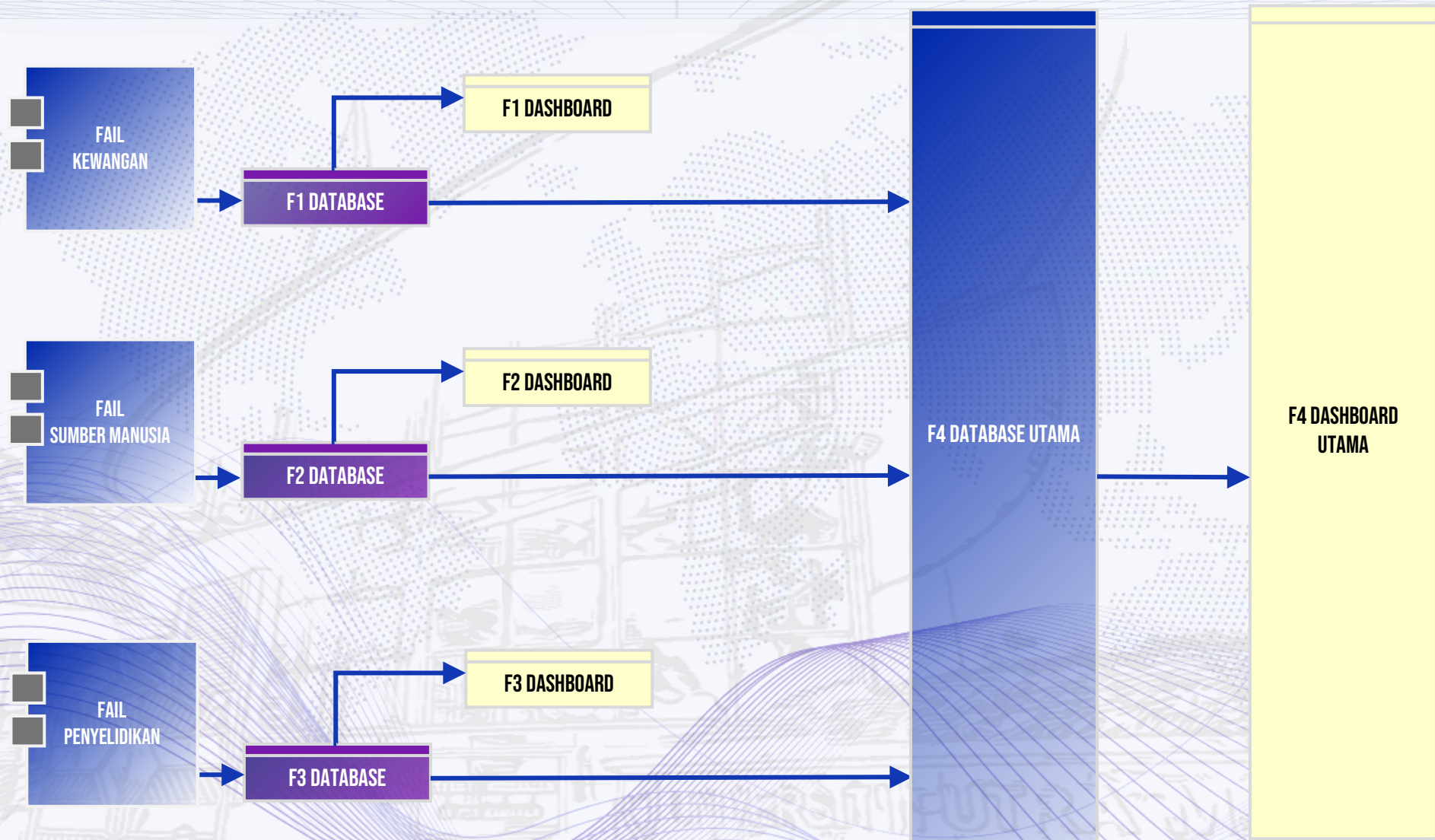
3.

Keperluan
Pemantauan
Tugasan Audit
Secara Lebih
Sistematik

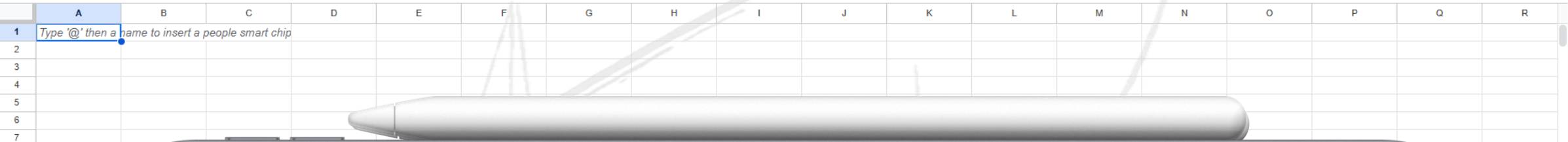
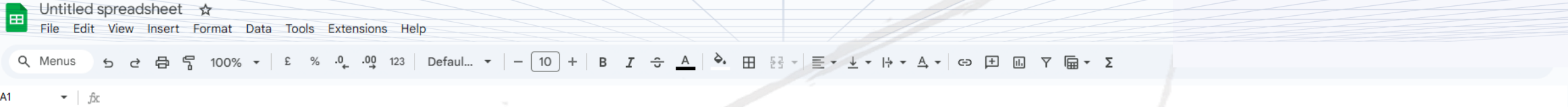
4.

Keperluan
Meningkatkan
Kecekapan dan
Pemantauan
Tindakan Auditi

INTEGRASI DARI PELBAGAI SUMBER



BUKAN SEKADAR “KOSONG”



Penilaian Kendiri Pusat Tanggungjawab Tahun 2024

Universiti Putra Malaysia Kampus Bintulu

Status Penilaian	Skor Keseluruhan
Lengkap	100.00
	Cemerlang

81.9% Pamatuhan, **0.0%** Ketidapamatuhan, **18.1%** Tidak Berkaitan

Email Laporan Untuk Semakan & Pengesahan Ketua PTJ: Status: Email Berjaya Dihantar

Email Laporan Yang Disahkan Oleh Ketua PTJ Ke Bahagian Audit Dalam: Status: Email Berjaya Dihantar

1. Pengurusan Organisasi	2. Pengurusan Hasil	3. Pengurusan Perolehan	4. Pengurusan Amanah
Cemerlang Skor PTJ: 5.00 Skor Penuh: 5 % Pamatuhan: 100.0%	Cemerlang Skor PTJ: 20.00 Skor Penuh: 20 % Pamatuhan: 100.0%	Cemerlang Skor PTJ: 25.00 Skor Penuh: 25 % Pamatuhan: 100.0%	Cemerlang Skor PTJ: 10.00 Skor Penuh: 10 % Pamatuhan: 100.0%

5. Pengurusan Aset	6. Pengurusan Stor	7. Pengurusan Kenderaan

EKOSISTEM DIGITAL@AUDIT UPM

**PRODUCTIVITY
TOOLS** 

**WORKFLOW &
AUTOMATION
TOOLS**  

**DATA
ANALYTICS
TOOLS**  

**DOCUMENTATION
& EVIDENCE
TOOLS**  

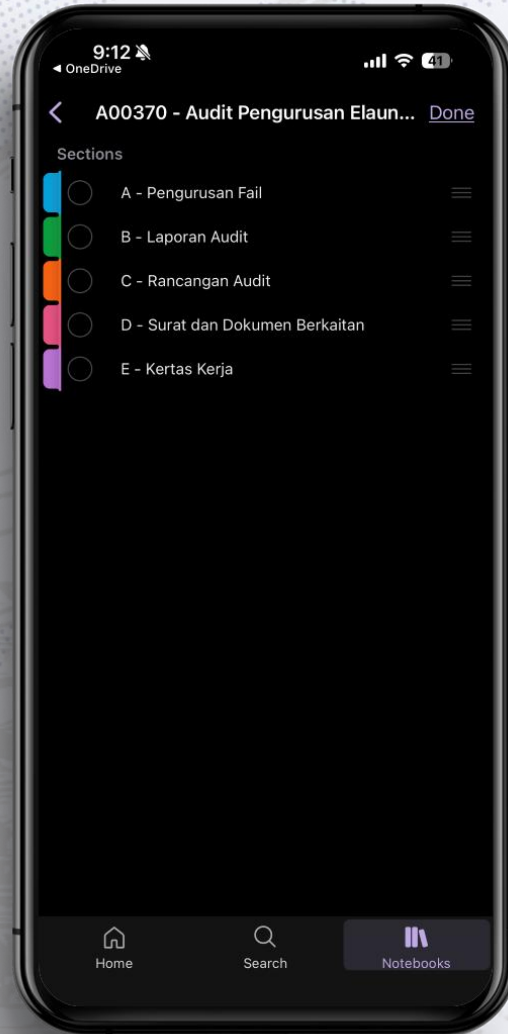
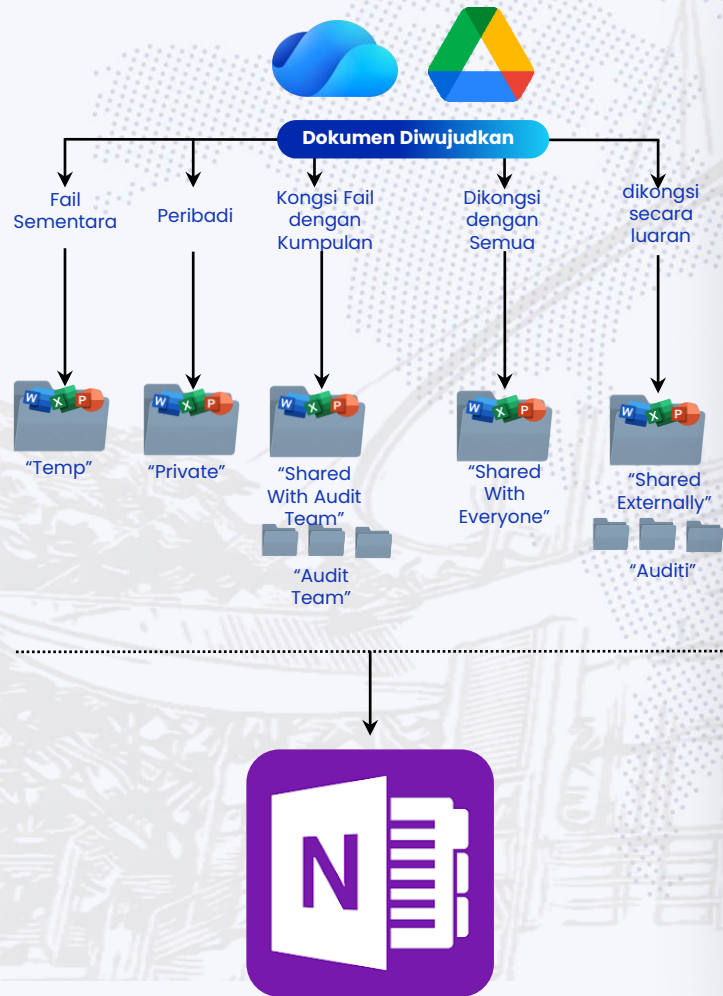
**DATA
VISUALIZATION
TOOLS**   

**NON-CODE
TOOLS** 



PEMFAILAN SECARA DIGITAL

Audit Digital Decision Tree



TIADA LAGI VERSI FAIL BERASINGAN

TIADA LAGI "MANA FAIL TERKINI?"

BOLEH DIAKSES BILA-BILA MASA

EKOSISTEM DIGITAL MEMBERI NILAI TAMBAH

PEMANTAUAN TUGASAN



KEMAJUAN PROJEK
REAL-TIME



PENGUKURAN
KECEKAPAN STAF

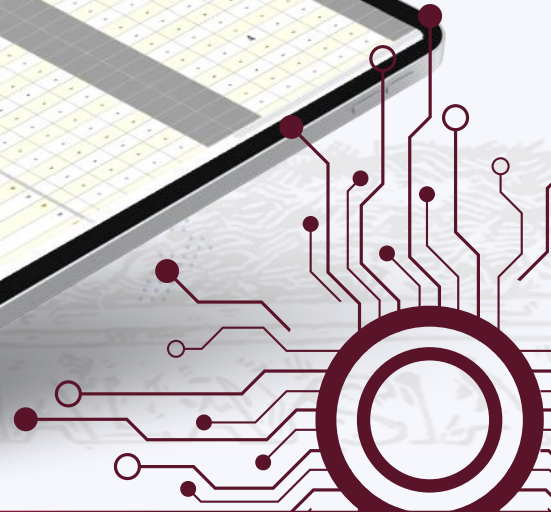


KENALPASTI MASA
SETIAP FASA AUDIT



PRODUKTIVITI DAN
TIMELINE AUDIT

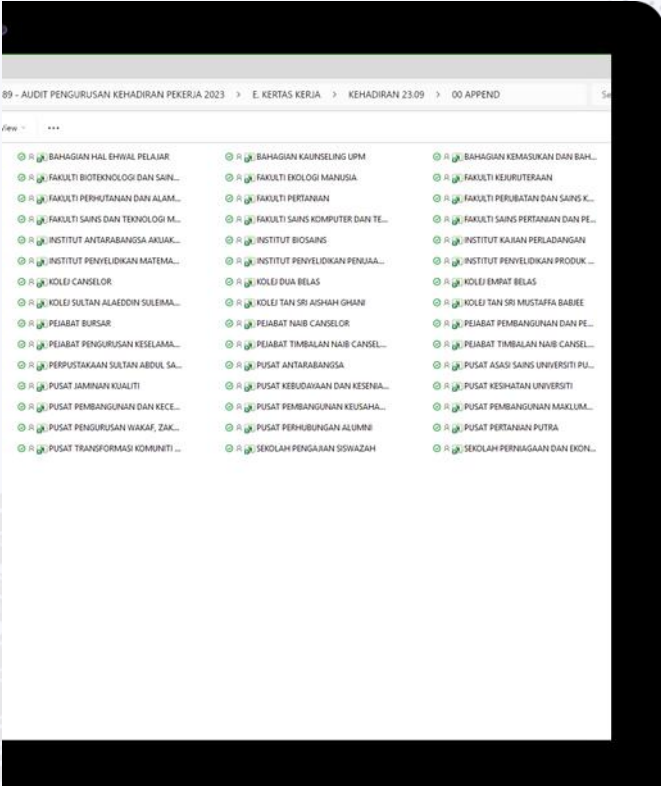
EKOSISTEM DIGITAL MEMBERI NILAI TAMBAH



ANALISA DATA BERSKALA BESAR



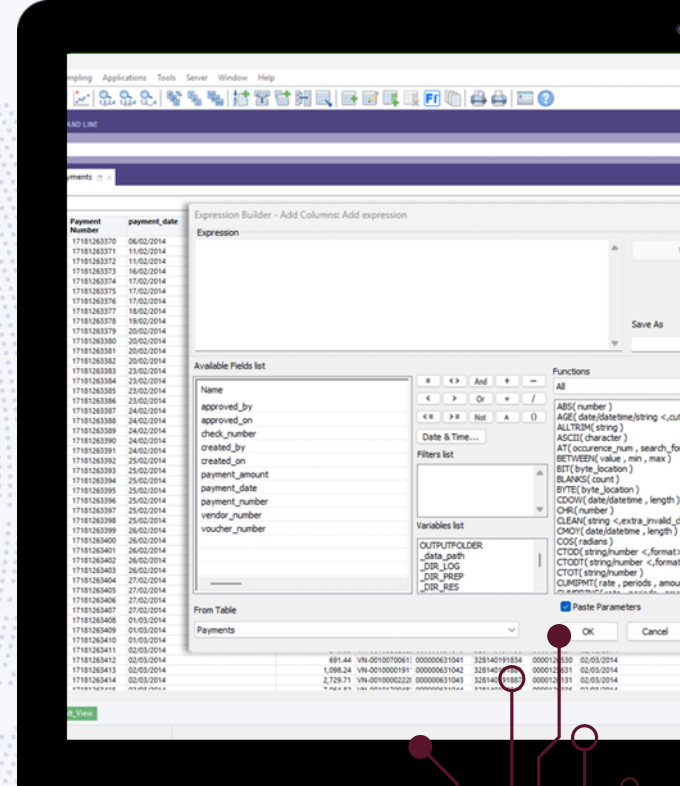
EKOSISTEM DIGITAL MEMBERI NILAI TAMBAH



DATA *CLEANING* DAN
NORMALIZATION SECARA
AUTOMATIK

LAPORAN ANALISIS
MENJADI KONSISTEN
DAN BOLEH DIULANG

MELIHAT TREND,
BACKLOG, ANOMALI
DAN RISIKO



VISUALISASI DATA

EKOSISTEM DIGITAL MEMBERI NILAI TAMBAH



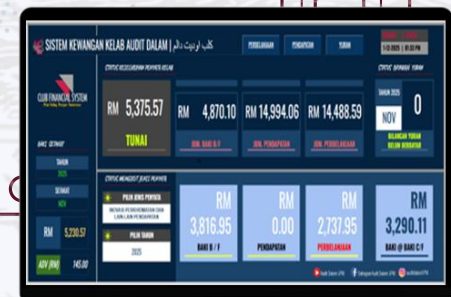
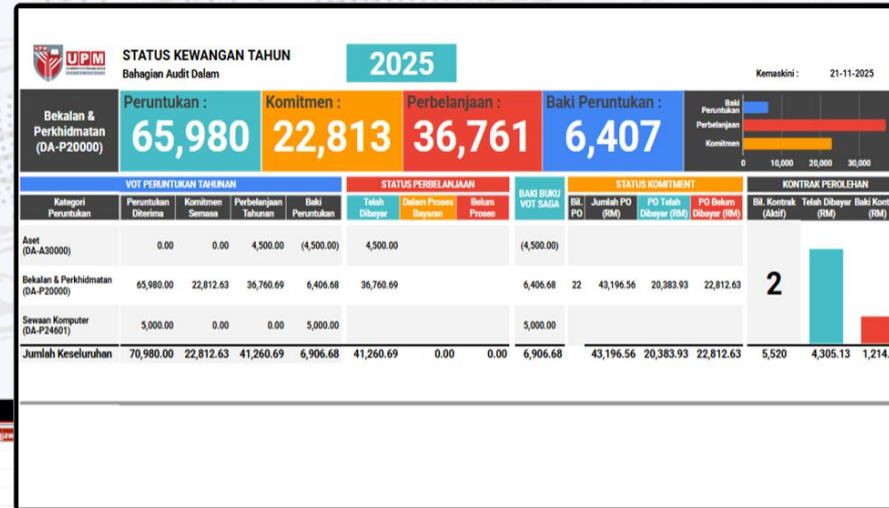
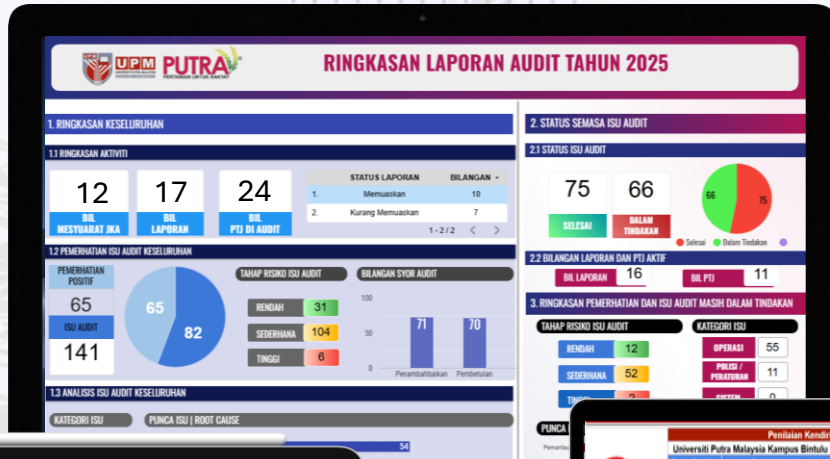
DATA KOMPLEKS KEPADA BENTUK VISUAL



KEPUTUSAN BERDASARKAN MAKLUMAT SEMASA



BUDAYA KERJA MENJADI LEBIH PROAKTIF, BUKAN REAKTIF



Berilmu Berbakti

audit.upm.edu.my

AUTOMASI



MENGHAPUSKAN TUGAS BERULANG



NOTIFIKASI STATUS SECARA AUTOMATIK



TINDAKAN SEGERA DIAMBIL

EKOSISTEM DIGITAL MEMBERI NILAI TAMBAH

The image shows a mobile dashboard for QAR (Quality Assessment Review) displayed on a tablet and a smartphone. The dashboard is titled "AKSES SISTEM AUDIT DASHBOARD" and features several key metrics and sections:

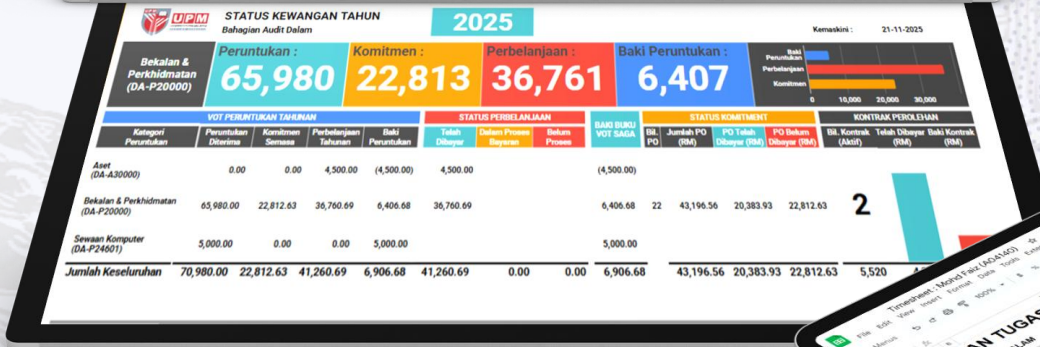
- AUDIT BULAN DIGITAL**:
 - BILANGAN KESELURUHAN ISU | PUSAT TANGGUNGJAWAB | TAHAP RISIKO: 1 (RENDAH), 1 (SEDERHANA), 1 (TINGGI)
 - BILANGAN PTJ: 1
 - ISU KESELURUHAN MENGIKUT KATEGORI: OPERASI (0), SISTEM (0), POLISI DAN PERATURAN (1)
- STATUS TINDAKAN PUSAT TANGGUNGJAWAB**:
 - SELESAI (0), SELESAI BERSYARAT (0), DIBAWA KE AUDIT SUGULUAN (1), DALAM TINDAKAN (0)
 - BIL 5: 0
 - ISU DALAM TINDAKAN (PERHATIAN JKA): 0
- TEPOH ISU DALAM TINDAKAN**:
 - DALAM TEMPOH (1), MELEBIHI TEMPOH (0)
- MAKLUMAT PEGAWAI YANG MENYELIA MAKLUMBALAS**:
 - Form fields for NAMA PEGAWAI, JAWATAN, and EMEL.
 - Buttons: EMEL KE KPTJ, EMEL KE AUDIT DALAM
- PENGESAHAN PENYELIA**:
 - Form fields for NAMA PEGAWAI, JAWATAN, and EMEL.
 - Buttons: EMEL KE KPTJ, EMEL KE AUDIT DALAM

The background shows the Apps Script code editor with a function named `replyToAuditTeam()` that sends an email notification. The code includes details like sheet URL, subject, body, and recipient email addresses.

Google Sheet Looker Power BI



 **AUDIT DASHBOARD**



 **DASHBOARD PENGURUSAN KEWANGAN**



 **DIAGNOSTIK KEWANGAN**

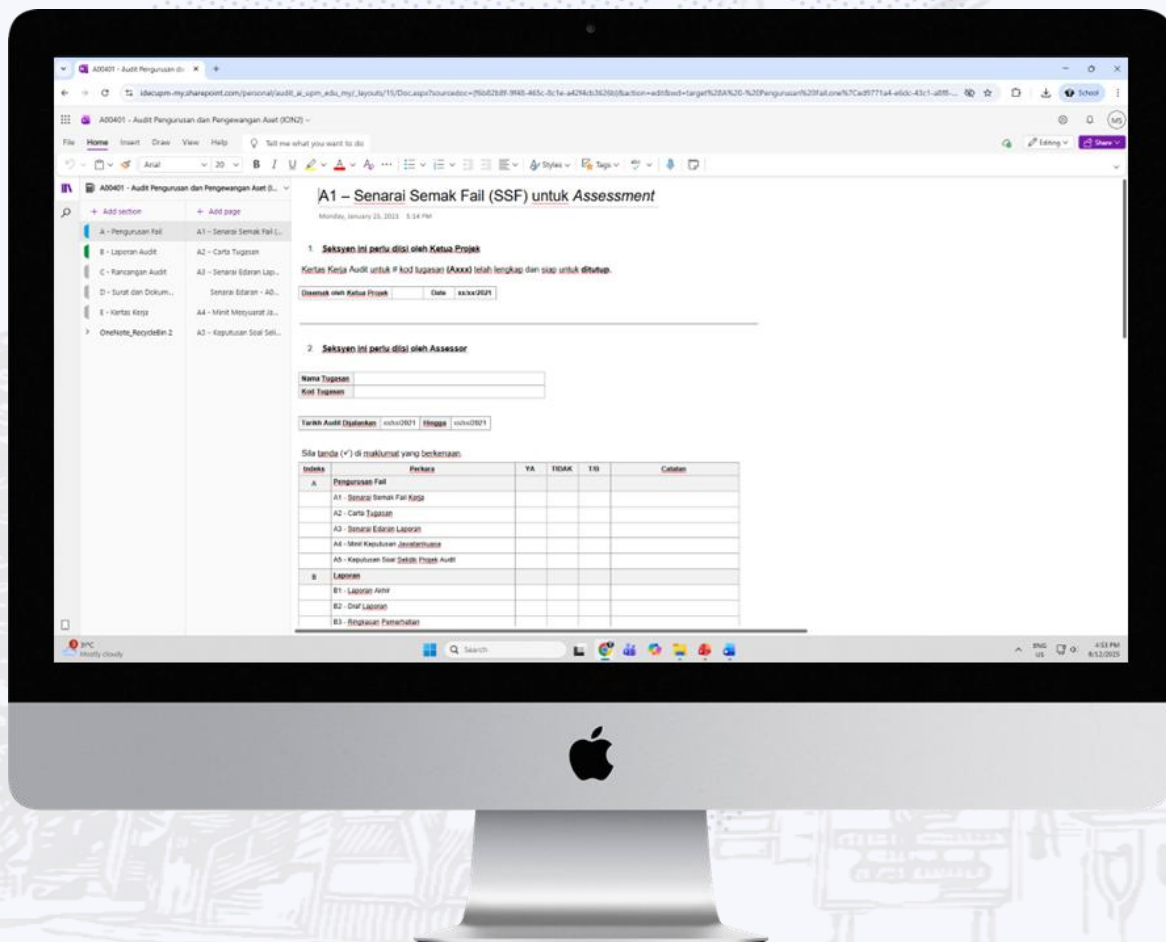


 **DASHBOARD TUGASAN AUDIT**


EKOSISTEM DIGITAL



OneNote



 **FAIL MESYUARAT
PENGURUSAN**

 **FAIL MESYUARAT
JAWATANKUASA AUDIT**

 **FAIL PROJEK
PENGAUDITAN**

 **FAIL MAKLUMAT
PERBINCANGAN**

EKOSISTEM DIGITAL

7 Appsheets



QUALITY ASSESMENT
REVIEW



VEHICLE MANAGEMENT
(VMAC)

Pertanian • Inovasi • Kehidupan
Berilmu Berbakti



audit.upm.edu.my

CONVERTING ACL TO PYTHON



CORE DATA OPERATIONS

<p>#1 IMPORT → read_csv</p> <p><code>pd.read_csv()</code></p> <p>Load data into a DataFrame</p>	<p>#2 EXPORT → .to_csv</p> <p><code>.to_csv()</code></p> <p>Save results to a file</p>
<p>#3 DEFINE FIELD → Column Assignment</p> <p><code>df['new'] = ...</code></p> <p>Create new column with logic</p>	<p>#4 EXTRACT → .copy()</p> <p><code>.copy()</code></p> <p>Create a copy of DataFrame</p>

ANALYTICAL PROCEDURES

<p>#6 SUMMARIZE/CLASSIFY → groupby()</p> <p><code>.groupby().sum()</code></p> <p>Group identical values to subtotal</p>	<p>#9 CROSSTAB → pivot_table()</p> <p><code>pd.pivot_table()</code></p> <p>Grid-based displays of counts</p>
<p>#11 STATISTICS → .Numeric Stats</p> <p><code>.mean(), .describe()</code></p> <p>Calculate field statistics</p>	<p>#17 STRATIFY → Intervals & groupby()</p> <p>Interval grouping</p> <p>Group data into intervals</p>
<p>#18 AGEING → pd.cut()</p> <p><code>pd.cut()</code></p> <p>Assign records to aging buckets</p>	<p>#19 SAMPLE → .sample()</p> <p><code>.sample(weights=...)</code></p> <p>Draw random or weighted samples</p>

ACL COMMAND

IMPORT
EXPORT
DEFINE FIELD
EXTRACT
SORT
SUMMARIZE
JOIN
APPEND
CROSSTAB
COUNT
STATISTICS
VERIFY
OUTLIERS
SEQUENCE
DUPLICATES
GAPS
STRATIFY
AGEING
SAMPLE
GROUP
LOOP

PYTHON PANDAS EQUIVALENT

`pd.read_csv()`
`.to_csv()`
`df['new'] = ...`
`.copy()`
`.sort_values()`
`.groupby().sum()`
`pd.merge()`
`pd.concat()`
`pd.pivot_table()`
`len(df[condition])`
`.mean(), .std(), .describe()`
`.isna(), .astype()`
`std(), mean(), Plotly`
`.shift()`
`.size() > 1`
Loop comparison `[i+1] - [i]`
interval grouping
`pd.cut()`
`.sample(weights=...)`
`cumsum()`
`for, date_range`

COMBINING & ORGANIZING DATA

<p>#5 SORT → .sort_values()</p> <p><code>.sort_values()</code></p> <p>Reorder records physically</p>	<p>#7 JOIN → pd.merge()</p> <p><code>pd.merge()</code></p> <p>Merge two tables into one</p>
<p>#8 APPEND → pd.concat()</p> <p><code>pd.concat()</code></p> <p>Combine records vertically</p>	<p>#20 GROUP → Conditionals</p> <p><code>cumsum()</code></p> <p>Complex record-by-record execution</p>

INTEGRITY & CONTROL TESTING

<p>#10 COUNT → Boolean Filtering</p> <p><code>len(df[condition])</code></p> <p>Count specific records</p>	<p>#12 VERIFY → isna().any()</p> <p><code>.isna(), .astype()</code></p> <p>Validate data against definitions</p>
<p>#13 OUTLIERS → Z-Score / Plotly</p> <p><code>std(), Plotly</code></p> <p>Identify statistical outliers</p>	<p>#14 SEQUENCE → .shift()</p> <p><code>.shift()</code></p> <p>Check if records are in order</p>
<p>#16 GAPS → Row-by-Row Comparison</p> <p><code>[i+1] - [i]</code></p> <p>Find missing numbers in a sequence</p>	<p>#21 BONUS: LOOP → date_range</p> <p><code>for, date_range</code></p> <p>Repeatedly execute commands</p>

PRINSIP UTAMA “DIGITAL BEST PRACTICE”

01

AUTOMATION FIRST

Mengautomasi tugas berulang untuk meningkatkan kecekapan, ketepatan dan masa tindakan.

02

DATA-DRIVEN DECISION MAKING

Keputusan strategik dan operasi dibuat berdasarkan data yang lengkap, tepat dan masa nyata.

03

USER-CENTRIC DESIGN

Sistem dan proses direka bentuk dengan mengambil kira pengalaman pengguna.

04

STANDARDIZATION & GOVERNANCE

Semua proses digital mematuhi standard, berstruktur, selamat, konsistensi dan integriti data.

05

CONTINUOUS AUDITING

Pendekatan berasaskan agile melibatkan pemantauan dan penambahbaikan berterusan untuk memastikan sistem kekal relevan dan responsif kepada perubahan keperluan.

DIGITAL MATURITY MODEL

INTEGRATED

Sistem-sistem utama saling berhubung dan berkongsi data. Data menjadi "single source of truth".

AUTOMATED

Proses utama telah diautomasi menggunakan workflow, notifikasi dan validasi data

INTELLIGENT

AI atau automasi pintar untuk membuat ramalan, amaran awal dan cadangan tindakan






DIGITIZED

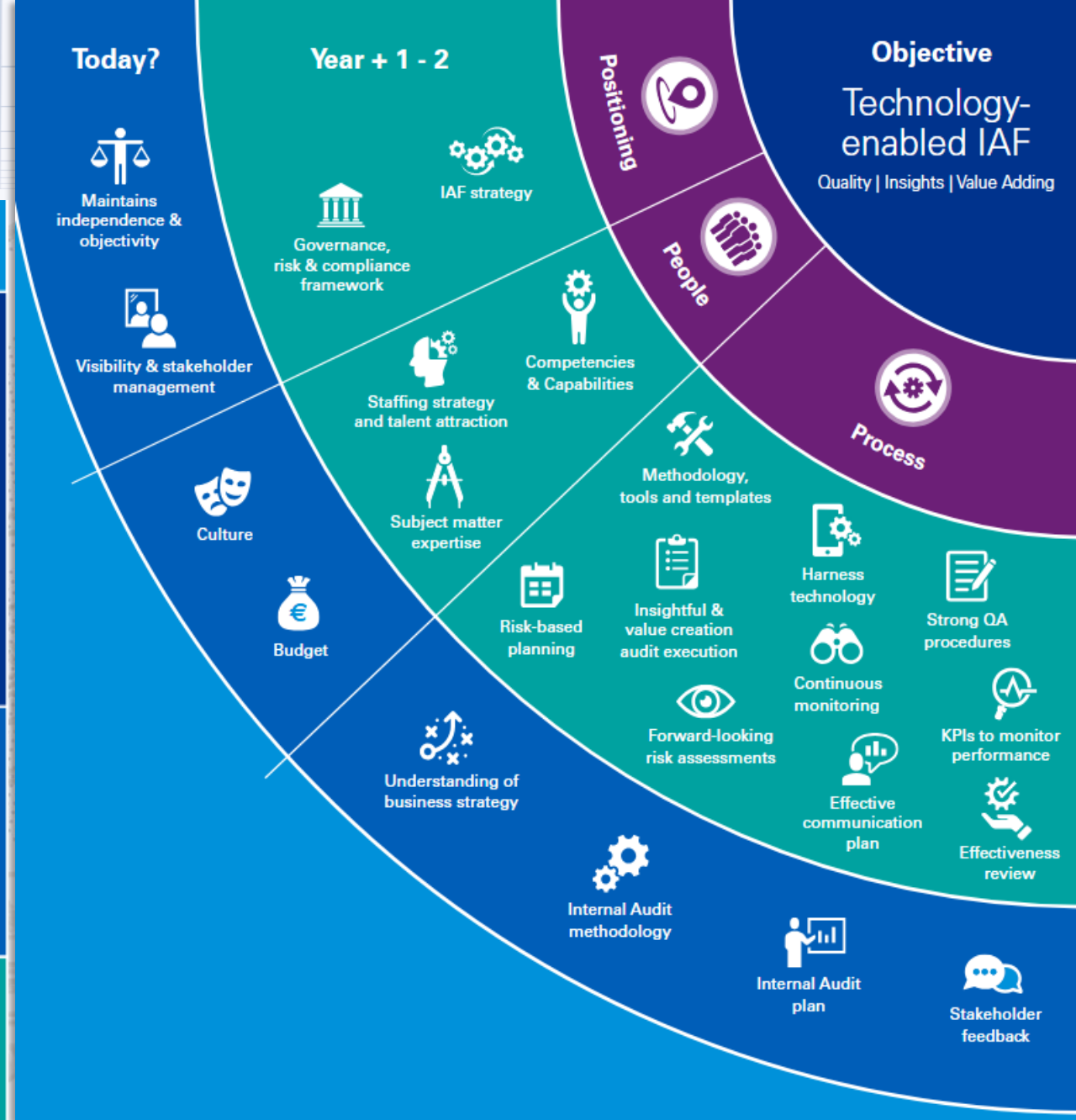
Dokumen dan borang sudah dalam bentuk digital tetapi proses masih manual.

MANUAL

Semua proses dijalankan secara fizikal, berasaskan kertas, Excel atau e-mel tanpa workflow formal

ROADMAP TO TECHNOLOGY-ENABLED

	Positioning 	People 	Process 
Short term 	<ul style="list-style-type: none"> Broaden data analytics vision of IAF and client Putting together a project plan and team with clear responsibilities (incl. success criteria) Perform stakeholder mapping data analytics Determine pilot audits in which scoping is clearly delineated Refine the roadmap and present it to MT 	<ul style="list-style-type: none"> Inventory data analytics expertise and compare it with the required competency matrix Set up data analytics training program Hire external data analytics expertise 	<ul style="list-style-type: none"> Retrieving data as part of audit preparation Include data analytics in the work program as a permanent element in risk analysis, preparation and implementation Working group to develop and refine data analytics methodology Mapping available tooling (and using it during pilots) Presenting data analytics results in reports Sharing lessons learned (positive and negative)
Medium term 	<ul style="list-style-type: none"> Data analytics integrated in annual IAF plan (budget, hours) Data analytics permanent part in preparation of all audits Clear agreements with 1st and 2nd LOD about cooperation and division of tasks and responsibilities. 	<ul style="list-style-type: none"> IAF employees are part of data analytics project teams within the organization Data analytics knowledge building as a permanent element in employee development plan Recruitment 	<ul style="list-style-type: none"> Standardize data analytics in audit methodology Access to data lake for IAF employees + agreements about use Project group to map and evaluate available internal and external tooling Building data analytics best practices database
Long term 	<ul style="list-style-type: none"> Supported vision application of data analytics by IAF with sufficient resources 	<ul style="list-style-type: none"> Broad data analytics expertise team 	<ul style="list-style-type: none"> Data analytics integral part of IAF work



ROADMAP TO TECHNOLOGY-ENABLED

Now

Cyclical and regulatory compliance audits take priority.

Annual audit plan quickly becomes irrelevant as the business changes.

Audit and control work is primarily manual.

Audits are based on small, random samples.

Lengthy, written reporting on findings.

Most internal audit and control professionals have audit expertise only.

Audit frequency is quarterly at best.

Internal audit and control are often left out of strategic discussions.

Future

Internal audit and control prioritise future-focused emerging risk reviews and higher-impact operational reviews that drive value to the business.

Audit plan is responsive to disruption and flexes to meet shifting strategic demands.

Majority of audit and control work is enabled via data, analytics, and automation.

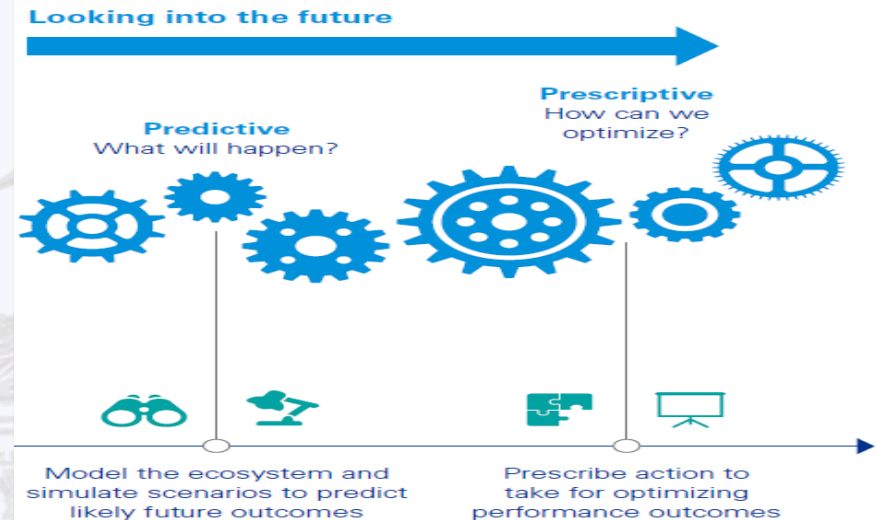
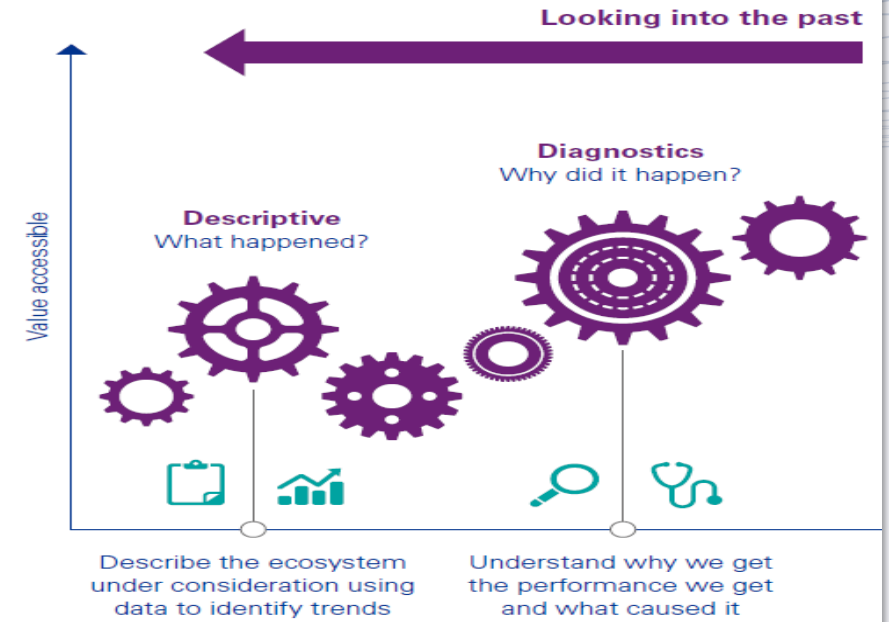
100 percent audit coverage.

Concise, visualised reporting on impact.

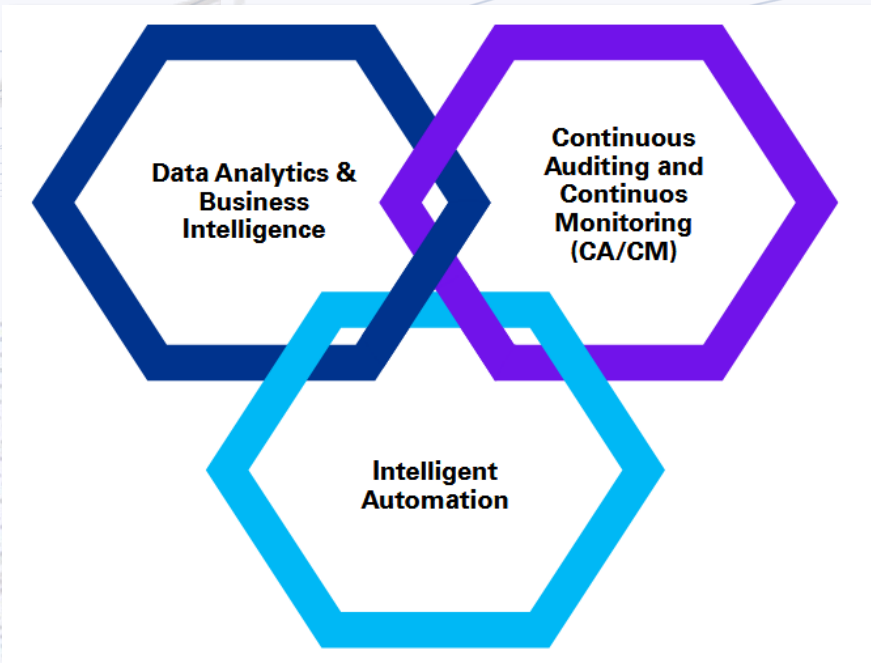
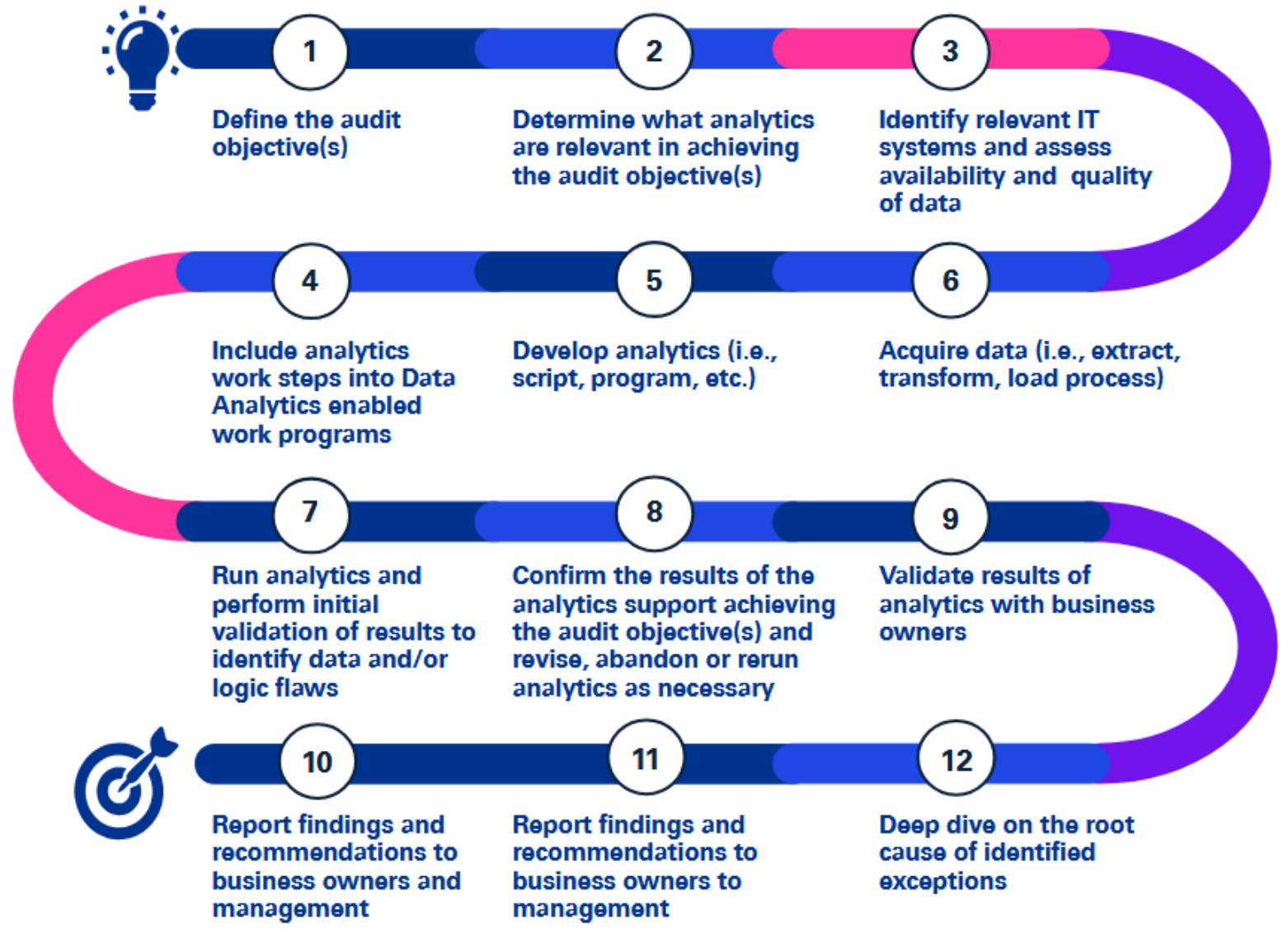
The internal audit and control teams possess a mix of business, audit, technology, and analytics skills.

Continuous, real-time auditing and control monitoring is a reality.

Internal audit and control are included in high-level conversations with the board and C-suite.



ROADMAP TO TECHNOLOGY-ENABLED



20th Century Internal Audit

Focuses on objectivity in a role to detect weaknesses in how effectively the organization manages risk, usually by comparing against a defined standard.

21st Century Internal Audit

The rapid pace of change demands that internal audit work with the business to embed the risk and performance mindset into new process and technologies as they are implemented.

Internal Audit creates monitoring solutions adopted by the business blurring the boundaries between the first and second lines.

More than 50% of executives say that internal audit needs to...

- Be more diverse in skills and activities
- Be more proactive with stakeholders
- Be able to match the sophistication and complexity of audit targets.

PERKHIDMATAN DASHBOARD YADIM



AUDIT DAN KUALITI
STATUS PEMANTAUAN ISU AUDIT

TARIKH: 19/04/2025 MASA: 22:42:19

MENGENAI KAMI | FACEBOOK | HUBUNGI KAMI

TAJUK AUDIT

BILANGAN KESELURUHAN ISU | PUSAT TANGGUNGJAWAB | TAHAP RISIKO

1	0	RENDAH	0
BILANGAN PTJ	BILANGAN ISU	SEDERHANA	0
		TINGGI	0

ISU KESELURUHAN MENGIKUT KATEGORI

0	0	0
OPERASI	SISTEM	POLISI DAN PERATURAN

STATUS TINDAKAN PUSAT TANGGUNGJAWAB

SELESAI	SELESAI BERSYARAT	DIBAWA KE AUDIT SUSAJUAN	DALAM TINDAKAN	0
				ISU DALAM TINDAKAN (PERHATIAN JKA)

BIL 1

TEMPOH ISU DALAM TINDAKAN

0	0
DALAM TEMPOH	MELEBIHI TEMPOH

• MAKLUMAT PEGAWAI YANG MENYELIA MAKLUMBALAS •

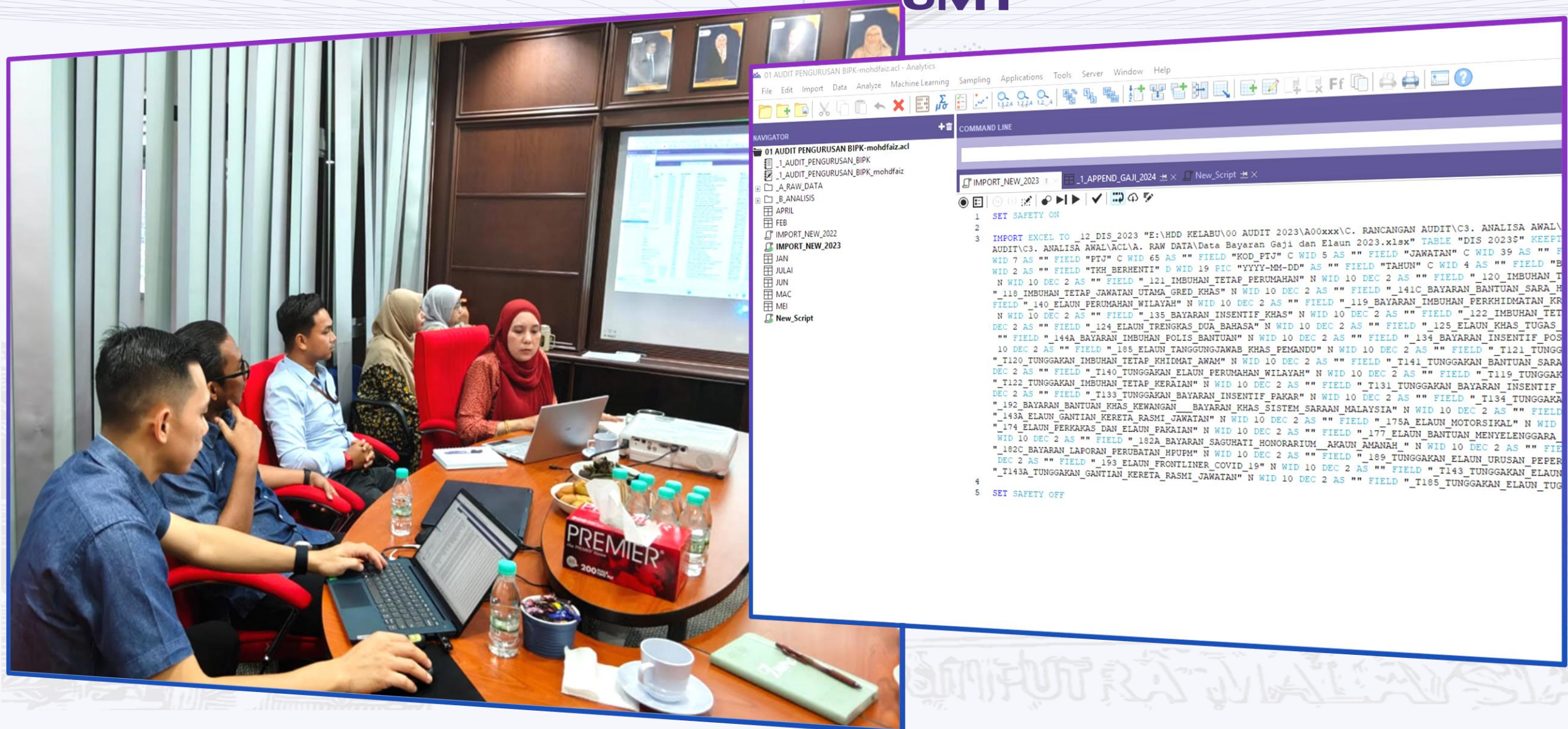
NAMA PEGAWAI :
JAWATAN :
EMEL :

• PENGESAHAN PENYELIA •

NAMA PEGAWAI :
JAWATAN :
EMEL :

EMEL KE KPTJ | EMEL KE AUDIT DALAM

PERKHIDMATAN DATA ANALITIK



```
01 AUDIT PENGURUSAN BIPK-mohdfaiz.aci - Analytics
File Edit Import Data Analyze Machine Learning Sampling Applications Tools Server Window Help
COMMAND LINE
IMPORT_NEW_2023
1 SET SAFETY ON
2
3 IMPORT EXCEL TO _12_DIS_2023 "E:\HDD KELABU\00 AUDIT 2023\A00xxx\C. RANCANGAN AUDIT\C3. ANALISA AWAL\
AUDIT\C3. ANALISA AWAL\ACL\A. RAW DATA\Data Bayaran Gaji dan Elaun 2023.xlsx" TABLE "DIS 2023" KEEP
WID 7 AS "" FIELD "PTJ" C WID 65 AS "" FIELD "KOD_PTJ" C WID 5 AS "" FIELD "JAWATAN" C WID 39 AS "" F
WID 2 AS "" FIELD "TKH_BERHENTI" D WID 19 PIC "YYYY-MM-DD" AS "" FIELD "TAHUN" C WID 4 AS "" FIELD "B
N WID 10 DEC 2 AS "" FIELD "121_IMBUHAN_TETAP_PERUMAHAN" N WID 10 DEC 2 AS "" FIELD "120_IMBUHAN_T
"118_IMBUHAN_TETAP_JAWATAN_UTAMA_GRED_KHAS" N WID 10 DEC 2 AS "" FIELD "141C_BAYARAN_BANTUAN_SARA_H
FIELD "140_ELAUN_PERUMAHAN_WILAYAH" N WID 10 DEC 2 AS "" FIELD "119_BAYARAN_IMBUHAN_PERKHIDMATAN_KR
N WID 10 DEC 2 AS "" FIELD "135_BAYARAN_INSENTIF_KHAS" N WID 10 DEC 2 AS "" FIELD "122_IMBUHAN_TET
DEC 2 AS "" FIELD "124_ELAUN_TRENGKAS_DUA_BAHASA" N WID 10 DEC 2 AS "" FIELD "125_ELAUN_KHAS_TUGAS
"" FIELD "144A_BAYARAN_IMBUHAN_POLIS_BANTUAN" N WID 10 DEC 2 AS "" FIELD "134_BAYARAN_INSENTIF_POS
10 DEC 2 AS "" FIELD "185_ELAUN_TANGGUNGJAWAB_KHAS_PEMANDU" N WID 10 DEC 2 AS "" FIELD "121_TUNGG
"1120_TUNGGAKAN_IMBUHAN_TETAP_KHIDMAT_AWAM" N WID 10 DEC 2 AS "" FIELD "1141_TUNGGAKAN_BANTUAN_SARA
DEC 2 AS "" FIELD "1140_TUNGGAKAN_ELAUN_PERUMAHAN_WILAYAH" N WID 10 DEC 2 AS "" FIELD "1119_TUNGGAK
"1122_TUNGGAKAN_IMBUHAN_TETAP_KERAIAN" N WID 10 DEC 2 AS "" FIELD "1131_TUNGGAKAN_BAYARAN_INSENTIF_
DEC 2 AS "" FIELD "1133_TUNGGAKAN_BAYARAN_INSENTIF_PAKAR" N WID 10 DEC 2 AS "" FIELD "1134_TUNGGAKA
"192_BAYARAN_BANTUAN_KHAS_KEWANGAN_BAYARAN_KHAS_SISTEM_SARAAN_MALAYSIA" N WID 10 DEC 2 AS "" FIELD
"143A_ELAUN_GANTIAN KERETA_RASMI_JAWATAN" N WID 10 DEC 2 AS "" FIELD "175A_ELAUN_MOTORSIKAL" N WID
"174_ELAUN_PERKAKAS_DAN_ELAUN_PAKAIAN" N WID 10 DEC 2 AS "" FIELD "177_ELAUN_BANTUAN_MENYELENGGARA
WID 10 DEC 2 AS "" FIELD "182A_BAYARAN_SAGUHAHI_HONORARIUM_AKAUN_AMANAH" N WID 10 DEC 2 AS "" FIE
"182C_BAYARAN_LAPORAN_PERUBATAN_HPUPM" N WID 10 DEC 2 AS "" FIELD "189_TUNGGAKAN_ELAUN_URUSAN_PEPER
DEC 2 AS "" FIELD "193_ELAUN_FRONTLINER_COVID_19" N WID 10 DEC 2 AS "" FIELD "1143_TUNGGAKAN_ELAUN
"143A_TUNGGAKAN_GANTIAN_KERETA_RASMI_JAWATAN" N WID 10 DEC 2 AS "" FIELD "1185_TUNGGAKAN_ELAUN_TUG
4
5 SET SAFETY OFF
```

PERKHIDMATAN AUDIT ICT



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