**Appendix 1 – Information Items for the IT Governance System**

After eliminating duplications, we concluded with a list of 77 information items (Table 13)

| # | IT Governance Information Item | More detailed description or context based on COBIT 2019 Practices and Activities |
| --- | --- | --- |
| 1 | Communications of changed compliance requirements | [From MEA03.03] Communicate new and changed compliance requirements to all relevant personnel, based on regular review and adjustment of policies, principles, standards, procedures and methodologies for their effectiveness. |
| 2 | Constitution/bylaws/statutes of organization | [From Outside] Analysis and identification of the internal environmental factors (legal, regulatory and contractual obligations) and trends in the business environment that may influence governance design |
| 3 | Governance/decision making model | [From Outside] The overall corporate governance model of the organisation |
| 4 | Laws/regulations | [From Outside] Applicable laws and regulations to the organisation, especially laws and regulations which affect I&T |
| 5 | Business environment trends | *Self-explaining* |
| 6 | Performance reports | [From MEA01.04] Periodically review and report performance against targets. Use a method that provides a succinct all-around view of I&T performance and fits within the enterprise monitoring system. |
| 7 | Status and results of actions | [From MEA01.05] Report reviewed management responses to identified deviations from expected performance and results of actions to relevant stakeholders (Board and Exec Mgmt in this case) |
| 8 | Results of internal control monitoring and reviews | [From MEA02.01.03] Perform internal control monitoring and evaluation activities based on organizational governance standards and industry accepted frameworks and practices. Also include monitoring and evaluation of the efficiency and effectiveness of managerial supervisory activities |
| 9 | Results of benchmarking and other evaluations | [From MEA02.01.07] Regularly evaluate the performance of the control framework, benchmarking against industry accepted standards and good practices. Consider formal adoption of a continuous improvement approach to internal control monitoring. |
| 10 | Results of reviews of self-assessments | [From MEA02.03] Encourage management and process owners to improve controls  proactively through a continuing program of self-assessment that evaluates the completeness and effectiveness of management’s controls. |
| 11 | Compliance confirmations | [From MEA03.03.01] Regularly evaluate organizational policies, standards, procedures and methodologies in all functions of the enterprise to ensure compliance with relevant legal and regulatory requirements in relation to the processing of information |
| 12 | Compliance assurance reports | [From MEA03.04] Obtain and report assurance of compliance and adherence with policies, principles, standards, procedures and methodologies. Confirm that  corrective actions to address compliance gaps are closed in a timely manner. |
| 13 | Reports of noncompliance issues and root causes | [From MEA03.04] Obtain and report assurance of compliance and adherence with policies, principles, standards, procedures and methodologies. Confirm that  corrective actions to address compliance gaps are closed in a timely manner. |
| 14 | Assurance plans | [From MEA04.02] Develop an overall yearly plan for assurance initiatives containing the consolidated assurance objectives |
| 15 | Audit Reports | *Self-explaining* |
| 16 | Obligations | [From Outside] Relevant obligations (regulatory, legislation, common law, contractual), standards and guidelines I&T has to comply with. |
| 17 | Enterprise governance guiding principles | [EDM01.01.06] Articulate principles that will guide the design of governance and decision making of I&T after analysing internal and external context, role of I&T and regulatory requirements. |
| 18 | Decision-making model | *[EDM01.01.07] Self-explaining* |
| 19 | Authority Levels | [EDM01.01.08] appropriate levels of authority delegation, including threshold rules, for I&T decisions. |
| 20 | Enterprise governance communication | [EDM01.02] Inform leaders on I&T governance principles and obtain their support,  buy-in and commitment. Guide the structures, processes and practices for the governance of I&T in line with the agreed governance principles, decision-making models and authority levels. Define the information required for informed decision making. |
| 21 | Reward system approach | [EDM01.02.07] Direct the establishment of a reward system to promote desirable cultural change |
| 22 | Feedback on governance effectiveness and performance | [EDM01.03] Monitor the effectiveness and performance of the enterprise’s  governance of I&T. Assess whether the governance system and implemented mechanisms (including structures, principles and processes) are operating effectively and provide appropriate oversight of I&T to enable value creation |
| 23 | Definition of strategic initiatives | [From APO02.05] Investment mix that achieves the right balance among a number of dimensions, including an appropriate balance of short- and long-term returns, financial and non-financial benefits, and high- and low-risk investments |
| 24 | Risk assessment initiatives | [From APO02.05] Investment mix that achieves the right balance among a number of dimensions, including an appropriate balance of short- and long-term returns, financial and non-financial benefits, and high- and low-risk investments |
| 25 | Strategic Roadmap | [From APO02.05.02] Detail a road map that defines the incremental steps required to achieve the goals and objectives of the I&T strategy. Ensure actions are included to train people with new skills, support adoption of new technology, sustain change throughout the organization, etc |
| 26 | Definitions of standard services | [From APO09.01.01] Assess current I&T services and service levels to identify gaps between existing services and the business activities they support. Identify areas for improvement of existing services and service level options |
| 27 | Service Definitions | [From BAI03.11.01] Propose definitions of the new or changed IT products and services to ensure that they are fit for purpose. Document the proposed definitions in the portfolio list of products and services to be developed. |
| 28 | Investment types and criteria | [From EDM02.03.01] Define and communicate portfolio and investment types, categories, criteria and relative weightings to the criteria to allow for overall relative value scores |
| 29 | Investment return expectations | [From APO05.01] Determine potential sources of funds, different funding options and the implications of the funding source on the investment return expectations |
| 30 | Selected programs with ROI milestones | [From APO05.02.04 & APO05.02.05] Decide which candidate programs should be moved to the active investment portfolio. Decide whether rejected programs should be held for future consideration or provided with seed funding to determine if business case can be improved or discarded. Determine required milestones for each selected program’s full economic life cycle. Allocate and reserve total program funding per milestone. Move the program into the active investment portfolio. |
| 31 | Benefit results and related communications | [From APO05.05.01] Use the agreed metrics and track how benefits are achieved, how they evolve throughout the life cycle of programs and projects, how they are being delivered from I&T products and services, and how they compare to internal and industry benchmarks. Communicate results to stakeholders. |
| 32 | Stage-gate review results | [From BAI01.06.07] In accordance with stage-gate, release or iteration review criteria, undertake reviews to report on the progress of the program so that management can make go/no-go or adjustment decisions and approve further funding up to the following stage-gate, release or iteration |
| 33 | Investment portfolio performance reports | [From APO05.03.05] Provide an accurate view of the performance of the investment portfolio to all stakeholders |
| 34 | Defined investment mix | [From EDM02.01.05] Define an investment mix that achieves the right balance among a number of dimensions, including an appropriate balance of short- and long-term returns, financial and nonfinancial benefits, and high- and low-risk investments |
| 35 | Feedback on strategy and goals | [EDM02.01.02] Obtain a common understanding between IT and the other business functions on the potential opportunities for IT to enable and contribute to enterprise strategy |
| 36 | Identified resources and capabilities required to support strategy | [EDM02.01.03] Identify the broad categories of information systems, applications, data, IT services, infrastructure, I&T assets, resources, skills, practices, controls and relationships needed to support the enterprise strategy |
| 37 | Evaluation of strategic alignment | [EDM02.02.05] Evaluate how effectively the enterprise and I&T strategies have been integrated and aligned within the enterprise and with enterprise goals for delivering value |
| 38 | Evaluation of investment and services portfolios | [EDM02.02.08] Evaluate the portfolio of investments, services and assets for alignment with the enterprise’s strategic objectives; enterprise worth, both financial and nonfinancial; risk, both delivery risk and benefits risk; business process alignment; effectiveness in terms of usability, availability and responsiveness; and efficiency in terms of cost, redundancy and technical health |
| 39 | Requirements for stage-gate reviews | [EDM02.03.02] Define requirements for stage-gates and other reviews for significance of the investment to the enterprise and associated risk, program schedules, funding plans, and the delivery of key capabilities and benefits and ongoing contribution to value |
| 40 | Actions to improve value delivery | [EDM02.04.04] Upon review of reports, ensure that appropriate management corrective action is initiated and controlled |
| 41 | Feedback on portfolio and program performance | [EDM02.04.02] Collect relevant, timely, complete, credible and accurate data to report on progress in delivering value against targets. Obtain a succinct, high-level, all-around view of portfolio, program and I&T (technical and operational capabilities) performance that supports decision making. Ensure that expected results are being achieved |
| 42 | Emerging risk issues and factors | [From APO12.01.08] Perform periodic event and risk factor analysis to identify new or emerging risk issues and to gain an understanding of the associated internal and external risk factors |
| 43 | Enterprise risk management (ERM) principles | [From Outside] The overall ERM principles the organisation has adopted, e.g. COSO ERM Principles or equivalent. |
| 44 | Aggregated risk profile, including status of risk management actions | [From APO12.03.04] Regularly capture all risk profile information and consolidate it into an aggregated risk profile |
| 45 | Enterprise risk management (ERM) profiles and mitigation plans | [From Outside] The overall risk appetite and profile of the organisation as well as the risk mitigation approach |
| 46 | Risk analysis results | [From APO12.02.03] Estimate the frequency (or likelihood) and magnitude of loss or gain associated with I&T risk scenarios. Take into account all applicable risk factors and evaluate known operational controls |
| 47 | Risk analysis and risk profile reports for stakeholders | [From APO12.04.01] Report the results of risk analysis to all affected stakeholders in terms and formats useful to support enterprise decisions. Whenever possible, include probabilities and ranges of loss or gain along with confidence levels, to enable management to balance risk-return |
| 48 | Results of third-party risk assessments | [From APO12.04.05] Review the results of objective third-party assessments and internal audit and quality assurance reviews. Include them in the risk profile. Review identified gaps and I&T-related loss exposures to determine the need for additional risk analysis |
| 49 | Opportunities for acceptance of greater risk | [From APO12.04.04] On a periodic basis, for areas with relative risk and risk capacity parity, identify I&T-related opportunities that would allow the acceptance of greater risk and enhanced growth and return |
| 50 | Risk appetite guidance | [EDM03.01.02] Determine the risk appetite of the organization, i.e., the level of I&T-related risk that the enterprise is willing to take in its pursuit of enterprise objectives |
| 51 | Evaluation of risk management activities | [EDM03.01.06] Evaluate risk management activities to ensure alignment with the enterprise’s capacity for I&T-related loss and leadership’s tolerance of it. |
| 52 | Approved risk tolerance levels | [EDM03.01.03] Determine risk tolerance levels against the risk appetite, i.e., temporarily acceptable deviations from the risk appetite |
| 53 | Approved process for measuring risk management | [EDM03.02.03] Direct implementation of the appropriate mechanisms to respond quickly to changing risk and report immediately to appropriate levels of management, supported by agreed principles of escalation (what to report, when, where and how). |
| 54 | Key objectives to be monitored for risk management | [EDM03.02.05] Identify key goals and metrics of the risk governance and management processes to be monitored, and approve the approaches, methods, techniques and processes for capturing and reporting the measurement information |
| 55 | Risk management policies | [EDM03.02.04] Direct that risk, opportunities, issues and concerns may be identified and reported by anyone to the appropriate party at any time. Risk should be managed in accordance with published policies and procedures and escalated to the relevant decision makers. |
| 56 | Remedial actions to address risk management deviations | [EDM03.03.03] Monitor key goals and metrics of risk governance and management processes against targets, analyze the cause of any deviations, and initiate remedial actions to address the underlying causes |
| 57 | Risk management issues for the board | [EDM03.03.01] Report any risk management issues to the board or executive committee |
| 58 | Gaps and changes required to realize target capability | [From APO02.04.01] Identify all gaps and changes required to realize the target environment |
| 59 | Skill development plans | [From APO07.03.02] Identify gaps between required and available skills. Develop action plans, such as training (technical and behavioral skills), recruitment, redeployment and changed sourcing strategies, to address the gaps on an individual and collective basis |
| 60 | Decision results of vendor evaluations | [From APO10.02.03] Select the vendor that best fits the RFP. Document and communicate the decision, and sign the contract. |
| 61 | Guiding principles for allocation of resources and capabilities | [EDM04.01.02] Define the key principles for resource allocation and management of resources and capabilities so I&T can meet the needs of the enterprise according to the agreed priorities and budgetary constraints. For example, define preferred sourcing options for certain services and financial boundaries per sourcing option |
| 62 | Approved resources plan | [EDM04.01.03] Review and approve the resource plan and enterprise architecture strategies for delivering value and mitigating risk with the allocated resources |
| 63 | Guiding principles for enterprise architecture | [EDM04.01.05] Define principles for the management and control of the enterprise architecture |
| 64 | Principles for safeguarding resources | [EDM04.02.02] Establish principles related to safeguarding resources |
| 65 | Assigned responsibilities for resource management | [EDM04.02.01] Assign responsibilities for executing resource management. |
| 66 | Communication of resourcing strategies | [EDM04.02.03] Communicate and drive the adoption of the resource management strategies, principles, and agreed resource plan and enterprise architecture strategies |
| 67 | Remedial actions to address resource management deviations | [EDM04.03.03] Monitor resource performance against targets, analyze the cause of deviations, and initiate remedial action to address the underlying causes |
| 68 | Feedback on allocation and effectiveness of resources and capabilities | [EDM04.03.02] Monitor I&T-related sourcing strategies, enterprise architecture strategies, and business- and IT-related capabilities and resources to ensure that current and future needs and objectives of the enterprise can be met. |
| 69 | Actions to improve value delivery | [From EDM02.04.04 & EDM02.04.05] Upon review of reports, ensure that appropriate management corrective action is initiated and controlled. Upon review of reports, take appropriate management action as required to ensure that value is optimized |
| 70 | Feedback on allocation and effectiveness of resources and capabilities | [From EDM04.03] Monitor the key goals and metrics of the resource management processes. Determine how deviations or problems will be identified, tracked and reported for remediation |
| 71 | Assurance review results | [From MEA04.08.03] Provide management with a report (aligned with the terms of reference, scope and agreed reporting standards) that supports the results of the initiative and enables a clear focus on key issues and important actions |
| 72 | Assurance review report | [From MEA04.08.03] Provide management with a report (aligned with the terms of reference, scope and agreed reporting standards) that supports the results of the initiative and enables a clear focus on key issues and important actions |
| 73 | Reporting and communications principles | [EDM05.01.04] Maintain principles for communication with external and internal stakeholders, including communication formats and channels, and for stakeholder acceptance and sign-off of reporting |
| 74 | Evaluation of enterprise reporting requirements | [EDM05.01.02 & EDM05.01.03] Examine and make judgment on the current and future mandatory reporting requirements relating to the use of I&T within the enterprise (regulation, legislation, common law, contractual), including extent and frequency. Examine and make judgment on the current and future communication and reporting requirements for other stakeholders relating to the use of I&T within the enterprise, including required level of involvement/consultation and extent of communication/level of detail and conditions |
| 75 | Rules for validating and approving mandatory reports | [EDM05.02.03] Establish mechanisms for validation and approval of mandatory reporting |
| 76 | Escalation guidelines | [EDM05.02.04] Establish reporting escalation mechanisms |
| 77 | Assessment of reporting effectiveness | [EDM05.03.01 & EDM05.03.02] Periodically assess the effectiveness of the mechanisms for ensuring the accuracy and reliability of mandatory reporting. Periodically assess the effectiveness of the mechanisms for, and outcomes from, involvement of and communication with external and internal stakeholders |

Table 1 - List of IT Governance related Information Items according to COBIT 2019

**Appendix 2 – Structured / Unstructured Information**

The following definitions have been found for ‘structured’ information:

“The term structured information describes the data contained in fields. It is called structured because its nature and function are identified by metadata tags.” ([What Is the Difference between Structured and Unstructured Information? - Coveo Platform 7 - Online Help](https://onlinehelp.coveo.com/en/ces/7.0/administrator/what_is_the_difference_between_structured_and_unstructured_information.htm#:~:text=The%20term%20structured%20information%20describes%20the%20data%20contained,%28ex.%3A%20list%20items%20and%20area%20listings%29%20is%20structured.)-)

“Structured data is the data which conforms to a data model, has a well define structure, follows a consistent order and can be easily accessed and used by a person or a computer program. Structured data is usually stored in well-defined schemas such as Databases. It is generally tabular with column and rows that clearly define its attributes. SQL (Structured Query language) is often used to manage structured data stored in databases.” ([What is Structured Data? - GeeksforGeeks](https://www.geeksforgeeks.org/what-is-structured-data/))

“Structured data is data that has been organized into a formatted repository, typically a database, so that its elements can be made addressable for more effective processing and analysis.

A data structure is a kind of repository that organizes information for that purpose. In a database, for example, each field is discrete and its information can be retrieved either separately or along with data from other fields, in a variety of combinations. The power of the database is its ability to make data comprehensive, so that it yields useful information. A database query language, such as SQL (standard query language), allows a database administrator to interact with the database.

Structured data contrasts with unstructured and semi-structured data. The three can be considered to exist on a continuum, with unstructured data being the least formatted and structured data being the most formatted. Data is increasingly amenable to processing as it is increasingly structured.” ([What is structured data? - Definition from WhatIs.com (techtarget.com)](https://whatis.techtarget.com/definition/structured-data))

“The difference between structured data, unstructured data and semi-structured data:

Unstructured data has not been organized into a format that makes it easier to access and process. In reality, very little data is completely unstructured. Even things that are often considered unstructured data, such as documents and images, are structured to some extent. Structured data is basically the opposite of unstructured: It has been reformatted and its elements organized into a data structure so that elements can be addressed, organized and accessed in various combinations to make better use of the information. Semi-structured data lies somewhere between the two. It is not organized in a complex manner that makes sophisticated access and analysis possible; however, it may have information associated with it, such as metadata tagging, that allows elements contained to be addressed.

Here is an example: A Word document is generally considered to be unstructured data. However, you can add metadata tags in the form of keywords and other metadata that represent the document content and make it easier for that document to be found when people search for those terms -- the data is now semi-structured. Nevertheless, the document still lacks the complex organization of the database, so falls short of being fully structured data.

In reality, there is considerable overlap between the boundaries of the three categories, which are sometimes described collectively as the data continuum.” ([What is semi-structured data? - Definition from WhatIs.com (techtarget.com)](https://whatis.techtarget.com/definition/semi-structured-data))

**Appendix 3 – Typology validation table**

The table below shows the detailed results of the expert panel assessment of the typology for the information purpose dimension of IT Governance information items.

|  |  |  | **Assessors** | | | | | **Counts** | | | |  | **Final** |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **#** | **IT Governance Information Item** |  | **Assessor 1** | **Assessor 2** | **Assessor 3** | **Assessor 4** | **Assessor 5** | **Comm & Ref[[1]](#footnote-1)** | **Rules** | **Decisions** | **Reporting** |  |  |  |
| 1 | Communications of changed compliance requirements | S | Comm & Ref | Comm & Ref | Comm & Ref | Comm & Ref | Comm & Ref | 5 | 0 | 0 | 0 | **5** | Comm & Ref | 100% |
| 2 | Constitution/bylaws/statutes of organization |  | Rules | Rules | Rules | Rules | Comm & Ref | 1 | 4 | 0 | 0 | **4** | Rules | 80% |
| 3 | Governance/decision making model |  | Comm & Ref | Comm & Ref | Rules | Comm & Ref | Comm & Ref | 4 | 1 | 0 | 0 | **4** | Comm & Ref | 80% |
| 4 | Laws/regulations |  | Rules | Rules | Rules | Rules | Comm & Ref | 1 | 4 | 0 | 0 | **4** | Rules | 80% |
| 5 | Business environment trends |  | Comm & Ref | Comm & Ref | Comm & Ref | Comm & Ref | Comm & Ref | 5 | 0 | 0 | 0 | **5** | Comm & Ref | 100% |
| 6 | Performance reports |  | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 7 | Status and results of actions |  | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 8 | Results of internal control monitoring and reviews |  | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 9 | Results of benchmarking and other evaluations | S | Comm & Ref | Reporting | Reporting | Reporting | Reporting | 1 | 0 | 0 | 4 | **4** | Reporting | 80% |
| 10 | Results of reviews of self-assessments |  | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 11 | Compliance confirmations |  | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 12 | Compliance assurance reports |  | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 13 | Reports of noncompliance issues and root causes |  | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 14 | Assurance plans |  | Decisions | Decisions | Decisions | Rules | Comm & Ref | 1 | 1 | 3 | 0 | **3** | Decisions | 60% |
| 15 | Audit Reports |  | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 16 | Obligations |  | Rules | Rules | Comm & Ref | Rules | Rules | 1 | 4 | 0 | 0 | **4** | Rules | 80% |
| 17 | Enterprise governance guiding principles |  | Comm & Ref | Rules | Rules | Rules | Rules | 1 | 4 | 0 | 0 | **4** | Rules | 80% |
| 18 | Decision-making model |  | Comm & Ref | Rules | Rules | Comm & Ref | Rules | 2 | 3 | 0 | 0 | **3** | Rules | 60% |
| 19 | Authority Levels | S | Decisions | Rules | Rules | Rules | Rules | 0 | 4 | 1 | 0 | **4** | Rules | 80% |
| 20 | Enterprise governance communication |  | Comm & Ref | Comm & Ref | Comm & Ref | Comm & Ref | Comm & Ref | 5 | 0 | 0 | 0 | **5** | Comm & Ref | 100% |
| 21 | Reward system approach |  | Decisions | Rules | Rules | Comm & Ref | Rules | 1 | 3 | 1 | 0 | **3** | Rules | 60% |
| 22 | Feedback on governance effectiveness and performance |  | reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | reporting | 100% |
| 23 | Definition of strategic initiatives |  | Decisions | Decisions | Comm & Ref | Decisions | Decisions | 1 | 0 | 4 | 0 | **4** | Decisions | 80% |
| 24 | Risk assessment initiatives |  | Decisions | Decisions | Decisions | Decisions | Decisions | 0 | 0 | 5 | 0 | **5** | Decisions | 100% |
| 25 | Strategic Roadmap | S | Decisions | Decisions | Decisions | Decisions | Decisions | 0 | 0 | 5 | 0 | **5** | Decisions | 100% |
| 26 | Definitions of standard services |  | Decisions | Decisions | Decisions | Decisions | Decisions | 0 | 0 | 5 | 0 | **5** | Decisions | 100% |
| 27 | Service Definitions |  | Rules | Decisions | Decisions | Comm & Ref | Decisions | 1 | 1 | 3 | 0 | **3** | Decisions | 60% |
| 28 | Investment types and criteria |  | Rules | Rules | Rules | Comm & Ref | Decisions | 1 | 3 | 1 | 0 | **3** | Rules | 60% |
| 29 | Investment return expectations |  | Comm & Ref | Comm & Ref | Comm & Ref | Comm & Ref | Decisions | 4 | 0 | 1 | 0 | **4** | Comm & Ref | 80% |
| 30 | Selected programs with ROI milestones |  | Decisions | Decisions | Decisions | Decisions | Decisions | 0 | 0 | 5 | 0 | **5** | Decisions | 100% |
| 31 | Benefit results and related communications |  | Comm & Ref | Comm & Ref | Reporting | Comm & Ref | Reporting | 3 | 0 | 0 | 2 | **3** | Comm & Ref | 60% |
| 32 | Stage-gate review results |  | Reporting | Reporting | Reporting | Comm & Ref | Reporting | 1 | 0 | 0 | 4 | **4** | Reporting | 80% |
| 33 | Investment portfolio performance reports |  | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 34 | Defined investment mix |  | Decisions | Rules | Rules | Decisions | Decisions | 0 | 2 | 3 | 0 | **3** | Decisions | 60% |
| 35 | Feedback on strategy and goals |  | Reporting | Reporting | Reporting | Comm & Ref | Comm & Ref | 2 | 0 | 0 | 3 | **3** | Reporting | 60% |
| 36 | Identified resources and capabilities required to support strategy |  | Comm & Ref | Comm & Ref | Reporting | Comm & Ref | Decisions | 3 | 0 | 1 | 1 | **3** | Comm & Ref | 60% |
| 37 | Evaluation of strategic alignment |  | Reporting | Reporting | Reporting | Comm & Ref | Comm & Ref | 2 | 0 | 0 | 3 | **3** | Reporting | 60% |
| 38 | Evaluation of investment and services portfolios |  | Reporting | Reporting | Reporting | Comm & Ref | Comm & Ref | 2 | 0 | 0 | 3 | **3** | Reporting | 60% |
| 39 | Requirements for stage-gate reviews | S | Rules | Rules | Rules | Rules | Rules | 0 | 5 | 0 | 0 | **5** | Rules | 100% |
| 40 | Actions to improve value delivery |  | Decisions | Decisions | Decisions | Decisions | Decisions | 0 | 0 | 5 | 0 | **5** | Decisions | 100% |
| 41 | Feedback on portfolio and program performance |  | Reporting | Reporting | Reporting | Comm & Ref | Reporting | 1 | 0 | 0 | 4 | **4** | Reporting | 80% |
| 42 | Emerging risk issues and factors | S | Comm & Ref | Comm & Ref | Comm & Ref | Comm & Ref | Comm & Ref | 5 | 0 | 0 | 0 | **5** | Comm & Ref | 100% |
| 43 | Enterprise risk management (ERM) principles |  | Rules | Rules | Rules | Rules | Rules | 0 | 5 | 0 | 0 | **5** | Rules | 100% |
| 44 | Aggregated risk profile, including status of risk management actions |  | Decisions | Reporting | Reporting | Comm & Ref | Decisions | 1 | 0 | 2 | 2 | **2** | Reporting | 40% |
| 45 | Enterprise risk management (ERM) profiles and mitigation plans |  | Decisions | Rules | Rules | Comm & Ref | Rules | 1 | 3 | 1 | 0 | **3** | Rules | 60% |
| 46 | Risk analysis results | S | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 47 | Risk analysis and risk profile reports for stakeholders |  | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 48 | Results of third-party risk assessments |  | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 49 | Opportunities for acceptance of greater risk |  | Reporting | Comm & Ref | Comm & Ref | Decisions | Comm & Ref | 3 | 0 | 1 | 1 | **3** | Comm & Ref | 60% |
| 50 | Risk appetite guidance |  | Rules | Rules | Rules | Rules | Decisions | 0 | 4 | 1 | 0 | **4** | Rules | 80% |
| 51 | Evaluation of risk management activities |  | Reporting | Reporting | Reporting | Comm & Ref | Reporting | 1 | 0 | 0 | 4 | **4** | Reporting | 80% |
| 52 | Approved risk tolerance levels |  | Rules | Rules | Rules | Rules | Rules | 0 | 5 | 0 | 0 | **5** | Rules | 100% |
| 53 | Approved process for measuring risk management |  | Decisions | Rules | Decisions | Rules | Rules | 0 | 3 | 2 | 0 | **3** | Rules | 60% |
| 54 | Key objectives to be monitored for risk management |  | Decisions | Rules | Comm & Ref | Decisions | Decisions | 1 | 1 | 3 | 0 | **3** | Decisions | 60% |
| 55 | Risk management policies |  | rules | Rules | Rules | Rules | Rules | 0 | 5 | 0 | 0 | **5** | rules | 100% |
| 56 | Remedial actions to address risk management deviations |  | Decisions | Decisions | Decisions | Decisions | Decisions | 0 | 0 | 5 | 0 | **5** | Decisions | 100% |
| 57 | Risk management issues for the board |  | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 58 | Gaps and changes required to realize target capability |  | Comm & Ref | Reporting | Reporting | Comm & Ref | Decisions | 2 | 0 | 1 | 2 | **2** | Reporting | 40% |
| 59 | Skill development plans |  | Decisions | Decisions | Decisions | Comm & Ref | Rules | 1 | 1 | 3 | 0 | **3** | Decisions | 60% |
| 60 | Decision results of vendor evaluations | S | Decisions | Decisions | Reporting | Decisions | Decisions | 0 | 0 | 4 | 1 | **4** | Decisions | 80% |
| 61 | Guiding principles for allocation of resources and capabilities |  | Rules | Rules | Rules | Rules | Rules | 0 | 5 | 0 | 0 | **5** | Rules | 100% |
| 62 | Approved resources plan |  | Decisions | Decisions | Decisions | Decisions | Rules | 0 | 1 | 4 | 0 | **4** | Decisions | 80% |
| 63 | Guiding principles for enterprise architecture |  | Rules | Rules | Rules | Rules | Rules | 0 | 5 | 0 | 0 | **5** | Rules | 100% |
| 64 | Principles for safeguarding resources |  | Rules | Rules | Rules | Rules | Rules | 0 | 5 | 0 | 0 | **5** | Rules | 100% |
| 65 | Assigned responsibilities for resource management |  | Decisions | Decisions | Decisions | Decisions | Rules | 0 | 1 | 4 | 0 | **4** | Decisions | 80% |
| 66 | Communication of resourcing strategies |  | Comm & Ref | Comm & Ref | Comm & Ref | Comm & Ref | Comm & Ref | 5 | 0 | 0 | 0 | **5** | Comm & Ref | 100% |
| 67 | Remedial actions to address resource management deviations |  | Decisions | Decisions | Decisions | Decisions | Decisions | 0 | 0 | 5 | 0 | **5** | Decisions | 100% |
| 68 | Feedback on allocation and effectiveness of resources and capabilities |  | Reporting | Reporting | Reporting | Comm & Ref | Comm & Ref | 2 | 0 | 0 | 3 | **3** | Reporting | 60% |
| 69 | Actions to improve value delivery |  | Decisions | Decisions | Decisions | Decisions | Decisions | 0 | 0 | 5 | 0 | **5** | Decisions | 100% |
| 70 | Feedback on allocation and effectiveness of resources and capabilities |  | Reporting | Reporting | Reporting | Comm & Ref | Reporting | 1 | 0 | 0 | 4 | **4** | Reporting | 80% |
| 71 | Assurance review results |  | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 72 | Assurance review report |  | Reporting | Reporting | Reporting | Reporting | Reporting | 0 | 0 | 0 | 5 | **5** | Reporting | 100% |
| 73 | Reporting and communications principles |  | Rules | Rules | Rules | Rules | Comm & Ref | 1 | 4 | 0 | 0 | **4** | Rules | 80% |
| 74 | Evaluation of enterprise reporting requirements |  | Reporting | Decisions | Reporting | Decisions | Decisions | 0 | 0 | 3 | 2 | **3** | Decisions | 60% |
| 75 | Rules for validating and approving mandatory reports |  | Rules | Rules | Rules | Rules | Rules | 0 | 5 | 0 | 0 | **5** | Rules | 100% |
| 76 | Escalation guidelines |  | Rules | Rules | Rules | Rules | Rules | 0 | 5 | 0 | 0 | **5** | Rules | 100% |
| 77 | Assessment of reporting effectiveness |  | Reporting | Reporting | Reporting | Decisions | Reporting | 0 | 0 | 1 | 4 | **4** | Reporting | 80% |
|  |  |  |  |  |  |  |  |  |  |  |  | **5** | **38** | **49%** |
|  |  |  |  |  |  |  |  |  |  |  |  | **4** | **19** | **25%** |
|  |  |  |  |  |  |  |  |  |  |  |  | **3** | **18** | **23%** |
|  |  |  |  |  |  |  |  |  |  |  |  | **2** | **2** | **3%** |
|  |  |  |  |  |  |  |  |  |  |  | **Average Percentage Agreement** | | | **84%** |

**Appendix 4 - Questionnaire for the Expert Panel on Information Quality Criteria Contingency Factors**

Afbeelding met tafel

Automatisch gegenereerde beschrijving

**Appendix 5 - Questionnaire for the Delphi Research Phase 2 on Quality Capability Levels for IT Governance Information Items**

Based on the previous survey, the information quality criteria for the information item <Information Item> have been ranked from most relevant to least relevant. Please review this list and change the ranking if you do not agree with the proposed ranking.

|  |  |  |
| --- | --- | --- |
| Information Quality Criteria | Proposed Rank | Your Rank |
| Accuracy (The extent to which information corresponds to the true value) | 1 |  |
| Completeness (The extent to which information is not missing and is of sufficient depth and breadth for the task at hand) | 2 |  |
| Traceability (The extent to which information’s source or sources can be found) | 3 |  |
| Interpretability (The extent to which information is in appropriate languages, symbols and units, and the definitions are clear for both human and machine users) | 4 |  |
| Relevancy (The extent to which information is applicable and helpful for the task at hand) | 5 |  |
| Currency (The extent to which information is sufficiently up to date for the task at hand) | 6 |  |
| Timeliness (The extent to which the moment in time the data is available for the task at hand is appropriate) | 7 |  |
| Objectivity (The extent to which information is unbiased, unprejudiced and impartial) | 8 |  |
| Consistency (The extent to which information is presented in the same format) | 9 |  |
| Understandability (The extent to which information is easily comprehended) | 10 |  |
| Precision (The extent to which different measurements of the information are close to each other) | 11 |  |
| Effectiveness (The extent to which information is able to meet the information needs for the task at hand) | 12 |  |
| Availability (The extent to which information is available when required, or easily and quickly retrievable) | 13 |  |
| Appropriate Amount (The extent to which the volume of information is appropriate for the task at hand) | 14 |  |
| Accessibility (The extent to which access to information is restricted appropriately to authorized parties) | 15 |  |
| Source Reliability (The extent to which information is highly regarded in terms of its source or content) | 16 |  |

A screenshot of a computer

Description automatically generated**Appendix 6 – Detailed Calculation of Relative ranking of variation between information quality criteria importance across information purpose categories**

**Appendix 7 – Generic Capability Model for Information Quality and Model Extensions**

**Reporting**



Figure 1 – Generic Capability Model and Model Extension for ‘Reporting’ IT Governance Information Items

**A screen shot of a chart

Description automatically generatedRules**

Figure 2 - Generic Capability Model and Model Extension for ‘Rules’ IT Governance Information Items

**Decisions**



Figure 3 - Generic Capability Model and Model Extension for ‘Decisions’ IT Governance Information Items

**Communication & Reference**



Figure 4 - Generic Capability Model and Model Extension for ‘’Communication and reference’ IT Governance Information Items

**Appendix 8 – Alternative Method for Capability Model Development**

****Next to the construction method proposed in section xx of the main document, an alternative method could be envisaged. The alternative method considers the average importance scores for each information criterion for each of the four categories in the Information Purpose typology. We again divide the range between the overall minimum importance score and overall maximum importance score into five equidistant intervals and associate capability levels to each interval. The result of this exercise is shown Figure 26.

Figure 5 – Generic Capability Model and Model Extension – Alternative Construction Method

We observe that almost all information quality criteria can be associated with more than one capability level, except the criterion ‘Appropriate Amount’. At the other end of the spectrum some criteria can be associated with four capability levels. The following design logic was applied to construct the model:

Information quality criteria that can be associated with only one or two capability levels are considered to be part of the generic model, and the average importance score for these criteria determines to which capability level they will be associated. An exception is made for the criterion ‘Accuracy’ that only narrowly was associated to three instead of two capability levels.

The remaining information quality criteria are considered to be part of contingency-based model extensions, and capability levels are associated per information purpose category, as in the original model above.

In Figure 6 the alternative model is shown, and in Figure 28, the generic model and model extension for the ‘Reporting’ information purpose category is shown.

Figure 6 - Information Capability Model: Alternative generic model and model extensions

A screen shot of a chart

Description automatically generatedFigure 7 - Alternative capability model for the 'Reporting' purpose category

When comparing the models for the ‘Reporting’ purpose category we observe that 11 out of the 16 criteria are associated to the same capability level. The remaining five criteria that are associated to a different capability level between both model variants are each time associated to a capability level that is either one level higher or lower, as shown in Table 12. We consider the differences between the capability model and the alternative capability model minimal, e.g. the correlation between both models for the ‘Reporting’ information purpose category is 0,93, whilst for the other categories correlation lies between 0,88 and 0,90.

|  |  |  |  |
| --- | --- | --- | --- |
| Information Quality Criteria | Capability Model (Capability Level) | Alternative Capability Model (Capability Level) | Difference |
| Accessibility | 5 | 4 | -1 |
| Timeliness | 3 | 4 | 1 |
| Traceability | 4 | 3 | -1 |
| Currency | 2 | 3 | 1 |
| Relevancy | 1 | 2 | 1 |

Table 2 – Differences between the Capability Model and the Alternative Capability Model

A potential explanation for these differences lies in the inherent limitations due to the sample sizes of our survey and the size of our panel. For now we will retain the originally proposed capability model, because the close resemblance between both models confirms the solidity of our original model.

**Appendix 9 – Information Item Capability Assessment Tool**

See also separate Excel Sheet (contact Authors)

The screenshots below are taken from a blank assessment sheet for a Strategic Roadmap information item, i.e. an information item from the ‘Rules’ purpose category.







1. Comm & Ref stands for Communication & Reference [↑](#footnote-ref-1)