

21 September 2020

Research and development

Chartered Institute of Internal Auditors

One of the ways organisations may seek to maintain competitive advantage is to look towards innovative ways to improve and grow the business its services/products and ways of working. Research and Development (R&D) is an invaluable tool to support this.

An organisations R&D may be undertaken to develop new products or enhance an existing product, service or product range. Being first to market, developing the most efficient process, offering something new or novel are ways of maintaining competitive advantage or growing new markets. With all R&D activities or projects comes risk.

This guide provides an introduction to R&D to help you plan an internal audit in this area.

What is R&D? Why is R&D important? R&D strategy How does R&D work? Potential risks to the success of R&D activity Potential risks and responses What can internal audit do?

What is R&D?

R&D can arise from two main areas.

- 1. Potential for the creation or improvement of products, processes or knowledge. For example, the product or service may be the first of its kind in the world.
- R&D can also arise when substantial improvements are made to an existing, maturing technology or product, for example mobile phone series 7, 8 and 9, one simple refinement to an existing product to improve its saleability, or creating a new way of operating that brings significant benefits (such as speed, cost, safety) to a business process.

Why is R&D important?

R&D is a high-risk area for any business, if it is well controlled and managed the wins are potentially huge eg increased revenue share, competitive advantage, increased profile and the opportunity to be leading edge. However, if the controls are weak, the risks not identified, assessed and managed the threats are equally huge eg loss of revenue, damage to reputation, financial loss, and customer loss.

Because of the importance of R&D, internal auditors need to understand the risks to the organisation if R&D initiatives are not undertaken; they also need to appreciate the risks inherent in

R&D activity and in a business being at the forefront of a technology/product development.

R&D strategy

As with other functions in an organisation there needs to be a R&D strategy for the function. This will define the direction of the function, driven by the organisations wider business strategy.

The organisations appetite may be to lead, working with newer products or technologies, or change and improve products in support of other organisational strategies.

The strategy should include:

- · Background
- Purpose
- Prioritisation and delivery
- Strategic goals
- Financial profile
- Targets and success

In some business sectors such as technology the entire enterprise may be built around strategic development of new products and applications. R&D in these types of business often becomes an essential or driving requirement of the business strategy.

How does R&D work?

Organisations may undertake a Systematic, Investigative and Experimental (SIE) study as a basis for R&D projects. This study is a series of planned activities to test or find out something that is not known in the field of science or technology. The objective should be the acquisition of new knowledge; the creation of new products or processes; or the improvement of existing products or processes. It is important for auditors to establish the objective of SIE from the outset of a review as this should form the baseline for management investment of time, money and resource.

The diagram below provides an overview of the SIE study in the R&D process:



Systematic

There must be a systematic approach on the steps or activities that are undertaken in the study. The steps must be executed in a planned or orderly manner.

Investigative

There must be activities undertaken to explore and uncover information to help in understanding the problem and to find out how to close the gap between the desired outcome and the state of scientific knowledge prior to the commencement of the study.

Experimental

The study comprises of steps to test the potential solution in solving a technical problem or creating a new product. The steps will often be repeated because the outcome is unknown and results from each round of testing would provide the organisation with more knowledge than before.

Potential risks to the success of R&D activity

Risks will be dependent upon the sector in which the organisation operates. The list below provides details of some generic risks.

However, it is vital that we as auditors hold discussions with key stakeholders to understand the risks specific to the industry in which we operate and the tolerance levels that would be deemed acceptable, for example:

- 1. Pharmaceutical companies and the development of life saving drugs.
 - Will not tolerate side effects that could seriously debilitate or kill patients almost zero tolerance.
- 2. Car manufacturing companies and innovation in the use of hybrids and technologies such as driverless cars.
 - Will not tolerate development of a driverless car that may kill drivers, cyclists or pedestrians –

almost zero tolerance.

- 3. Mobile phone companies and the improvement of existing technology and identifying new technologies.
 - Will not tolerate the use of radio waves that may damage user's health and wellbeing almost zero tolerance.
- 4. Financial services and the offering of new services that allow for greater efficiency, faster transaction delivery through various channels.
 - Will not allow insecure systems to be developed that may impact data privacy or increase the risk of identity fraud – agreed level of tolerance from the board.
- 5. Fashion and clothing companies' new developments, innovations, improvements in existing processes, in terms of fabric, style, stitching details, patterns, prints and their designs.
 - Will not allow unethical sourcing or development of fabrics which damage the environment agreed level of tolerance from the board.

Potential risks and responses

1. There is no strategic objective including a clear vision or direction set within the business to undertake the R&D activity.

Potential impact

- There is a loss of the organisation's competitiveness reducing market share.
- The organisation is not able to reach out to new customers or markets.
- Lack of clarity on potential markets for any R&D output.
- Money is spent on the wrong thing.
- No new products or services are launched by the company or the products/services are of poor quality.

Potential response

- Strategic objectives agreed by the board include the objectives for R&D activities.
- Responsibility for the R&D is assigned to a senior executive.
- A business plan/strategy has been prepared and agreed within the organisation.
- A governance committee is in place to provide oversight and monitor the R&D processes.
- Clearly defining the market and fully understanding its needs and wants through market validation.
- Estimated production costs and potential selling price are included in business case assumptions and updated when relevant data is obtained.

2. Ineffective leadership and/or uncoordinated R&D activity.

Potential impact

· No new products or services are launched by the company or the products/services are of poor

quality.

- There is a loss of the organisation's competitiveness reducing market share.
- Damage to the organisations reputation as they have lost sector profile as leading edge.

Potential response

- A business plan/strategy has been prepared and agreed within the organisation.
- It should include a development and delivery timeline which is periodically updated as appropriate.
- Roles and responsibilities should be agreed and documented.

3. Insufficient investment in R&D resulting in a lack of resources to achieve stated objectives.

Potential impact

- Projects cannot be delivered.
- There is a loss of the organisation's competitiveness reducing market share.
- The organisation is not able to reach out to new customers or markets.
- Time and effort are focused on developing a new product which once developed lack investment to produce and offer to customers/stakeholders.
- No new products or services are launched by the company or the products/services are of poor quality.

Potential response

- A business plan/strategy should be prepared and agreed within the organisation that includes risks and financial profiles.
- A robust financial appraisal and justification model has been developed and applied within the business for R&D activities.

4. R&D projects take too long with escalating costs.

Potential impact

- Overspend on budget.
- The organisation's internal processes are too complex making it slow to respond to new market changes.
- Competitors bring products to market more speedily and take market share.

Potential response

- There is a management framework in place to track each phase of the project (R&D project procedures).
- A performance measurement process is developed to monitor individual projects (including key performance indicators based on outcomes).
- Financial budgets are prepared, broken down into individual stages of the project and monitored (potential application of earned value analysis and variance analysis).
- Periodic reviews are undertaken to terminate projects if they are unlikely to be profitable or successful.
- · Gateways are created that require sign off by senior management.

 Dependent upon the significance of the 'new' product and the scale of the budget internal audit may be expected to review each stage/gateway before the development proceeds to the next stage.

5. Insufficient staff and/or staff do not have the right skills, experience and expertise to undertake the work.

Potential impact

- Projects cannot be progressed, undertaken or delivered.
- Projects are kicked off before an assessment of resources has been undertaken resulting in a waste of time and effort.
- Late start of projects resulting in being late to market.
- Competitors bring products to market more speedily and take market share.

Potential response

- Staffing structure in place with total numbers of staff/skills required for each R&D project.
- Forward skills and expertise planning and training programmes developed to address gaps.

6. R&D activity is unsuccessful and leads nowhere.

Potential impact

- Unnecessary costs incurred.
- Time and effort wasted.
- The customers have poor experiences with the company.
- The organisation's internal processes are too complex that make it very slow to respond to new market changes.

Potential response

- Clearly defining the market and fully understanding its needs and wants through market validation.
- Conducting sound proof of concept and technical feasibility studies, eg talking to experts in the field.
- There needs to be a process whereby there is an opportunity to explore new products which includes a go/no-go decision stage.

7. The technical feasibility of the product or service. (eg the quality of the product or service does not meet the expectations of the buyer).

Potential impact

- Unnecessary costs incurred.
- Damage to reputation.
- Damage to profile in the sector.
- Customer expectations not appropriately managed.

Potential response

- Conducting proof of concept and sound technical feasibility studies, eg talking to experts in the field.
- Investing in a small pilot exercise to test the market.
- Focus groups are in place for new products that include customers and key stakeholders.

8. Breach of another organisations intellectual property (IP) or compromise of own IP.

Potential impact

- Legal action is taken against the organisation.
- Poor publicity with impact on reputation.

Potential response

- Very early in the R&D process checking the 'IP position' around the new product to ensure it does not infringe on someone else's IP.
- Agreements are in place when working in partnership with a third party.
- Legal and regulatory requirement assessments form part of the R&D project approach and are undertaken as development continues to ensure changes in design, or construction do not inadvertently breach requirements.

9. Leakage of commercially sensitive information to competitors by employees or third parties involved in the development.

Potential impact

- Clues are given to competitor(s) who then launch similar updated/new products to market earlier.
- Industrial espionage may result in sabotage of a R&D project.

Potential response

- A security policy is in place with training provided to staff.
- Legally binding agreements eg non-disclosure agreements (NDA) are in place when working in partnership with a third party.
- Dependent upon the significance of the product staff may also be required to sign an NDA.
- · Staff are aware of the consequences associated with confidentiality breaches.
- Appropriate policies exist to ensure staff are aware of the requirements regarding confidentiality.

10. Breach of taxation laws or grant funding regulations.

Potential impact

- Legal action is taken against the organisation.
- Fine and penalties incurred.
- Damage to reputation.
- Damage to customer and stakeholder relationships.

Potential response

- Management have utilised the skills of specialist tax and grant subject matter experts to formulate appropriate and compliant processes.
- Checks are conducted to confirm compliance.
- Independent assurance internal audit should seek appropriate advice before attempting to do
 any work in the tax arena.
- Dependent upon location there may be country specific requirements associated with tax laws and regulations.

What can internal audit do?

R&D may be a high-risk area according to the nature of the organisation and the sector in which it operates. Alternatively, R&D can be an activity which an organisation undertakes to help mitigate or manage competition risks, or simply to enable it to diversify and move into new markets – ie to help it establish or maintain market dominance.

Whatever the reason your business undertakes R&D; ethics should be a primary consideration. If the business and employees have a clear steer in respect of standards, behaviours and conduct then there should be a solid foundation for the R&D control framework to develop.

A fundamental step for a R&D assurance assignment is to consider the ethical stance and risk appetite operating within the business. Internal audit should have discussions with key stakeholders to obtain their views on what assurances are needed and how they can be provided and which of the 3 lines of defence might provide the assurance perhaps at different levels in the R&D process.

It is important for the internal auditor undertaking an audit engagement to be competent, have sufficient knowledge, experience and appreciation of R&D processes to perform the review, and should be able to recognise the existence of risks or potential risks.

Internal audit can provide independent and objective assurance by ensuring that where management have undertaken their own reviews any actions that have been identified are appropriately recorded, verify that the actions are relevant to the findings, that the timescales for implementation of the actions are reasonable and that they are being implemented.

In addition, the following areas should be considered:

1. Governance culture and methodologies

- Is there a clear business strategy in place that has been approved and has the backing of the board and senior management?
- · Can leadership from the top be clearly seen and validated?
- · Is there a governance framework in place?
- · Are key stakeholders appropriately represented?
- Do the audit and risk committee have R&D on their agendas?
- Have terms of reference been drawn up for the R&D function and any steering /supervisory groups?
- Do they include the purpose, authority and responsibility and have they been formally approved?
- Is there a code of conduct/ethics which can be applied to R&D to steer risk appetite and acceptable behaviours?
- · Are annual research plans prepared, coordinated and approved?
- Is an up-to-date research inventory maintained?

- Is there a management framework in place to track all phases of each research project?
- Are minutes of meetings formally documented and actions followed-up?

The internal auditor should review supporting evidence to ascertain that the above is in place. A discussion with senior management should be held in order to understand in greater detail the governance framework.

2. Identification and review of risks in this area

- · Has R&D been included on risk registers, particularly the strategic risk register?
- Have individual risk registers been prepared for each R&D project and is there coordination of these risk registers?
- Are different projects reliant on the same facilities or personnel, or have inter-related dependencies (ie projects may be inter-related). The internal auditor should review and inspect the risk registers for the different projects and ensure that there is coordination of the risk registers among the different departments.
- Are risk management processes working effectively identification, evaluation and reporting of
 risks is complete and accurate? Review and inspect supporting evidence such as emails, board
 papers on the risk management process.

The internal auditor can consult with the organisation's risk management department to obtain the enterprise-wide risk register and the individual risk registers for the different R&D projects. The risk registers for the R&D projects should also be available from the R&D project teams. There should be clear evidence of risk assessment prior to the commencement of a R&D project ie within the supporting business case or proof of concept analysis.

3. Finance records are maintained for monitoring and legal requirements

- Are systems and processes in place for the monitoring and accountability of funds allocated to each phase of the project?
- Are systems and processes in place to evidence costs and charges to substantiate and claim R&D tax incentives?
- Are processes in place to understand how the various incentive schemes can be optimised by the organisation?
- Are the correct financial reporting standard (FRS) treatments being applied to the R&D costs and expenditure?

The internal auditor should review and inspect supporting evidence to ascertain that the above is in place, for example:

- a documented procedure on the monitoring of the accountability of funds allocated to each phase of the R&D projects and
- a documented procedure on the process to capture the costs and charges to substantiate on the R&D tax incentives and to optimise the tax incentive schemes.

The internal auditor should consult the finance department as a first point of contact to understand the processes and the in-house tax advisor to find out more about the tax processes, if appropriate/relevant.

4. Performance measurement process to track the outcomes of the research project and identify client expectations

· Are there mechanisms in place to retain documentation in support of scientific data and track the

desired outcomes of the research project?

- Have key performance indicators (KPIs) been established as part of the monitoring process, both quantitative and qualitative, and is progress analysed and reviewed against these?
- Have financial incentives and reward structure been aligned to ensure that the R&D activities are tied to the goals of the organisation?

The internal auditor should review supporting evidence to ascertain that the above is in place, for example:

- documented policies and procedures to retain documentation in support of the scientific data and track the desired outcomes of the research project
- documented procedures on the KPIs to monitor the progress of the R&D projects and
- how financial incentives and reward structures are used to tie the R&D activities to the goals of the organisation.

The internal auditor should consult with the R&D project manager to find out more about the performance measurement process.

5. HR planning addresses recruitment, retention and training needs

- Have processes been put in place for the recruitment and retention of staff with the necessary skills and experience for specific research posts?
- · Is this working effectively, with job roles being filled on a timely basis?
- Are exit interviews undertaken to understand why staff are leaving; and is this used to make changes to R&D project environments?
- Is monitoring and reporting of staff turnover within R&D reported to the board or a board subcommittee?
- Are any monitoring processes in place to ascertain whether R&D staff leavers are moving to jobs with competitors?
- Are there staff training plans in place that covers both organisational training and role specific training needs?

Review and inspect supporting evidence to ascertain that the above is in place, for example:

- documented policies and procedures on the recruitment and retention of staff for the research posts and
- approved job role requisition forms; reporting on staff turnover and staff training.

The internal auditor should talk to HR staff to understand how the recruitment and retention and training process operates and what checks and balances have been deployed to protect intellectual property and deter/detect sabotage within R&D.

Further reading

Standards

2230 - Engagement resource allocation

Implementation guides

2230 - Engagement resource allocation

Guidance

Human resources

How to approach unfamiliar areas of work