

Appendix C: Audit Questionnaire

Beta testing

Measuring Individual and Organisational Innovation Practices and Potential

Please enter your current:
Employment Position

Division

Organisation

Score (don't fill in)

External

Organisation

Individual

Fostering Technological Innovation. An Audit.

The following questionnaire was compiled for the purpose of beta testing a newly developed innovation audit as theme for a master's thesis in the management of technology. As such the questionnaire covers many different aspects of the innovation process, touching on things such as culture, creativity, flexibility, management style, and many others. Innovation is a diverse process and no one single best avenue for success exists. It is often a coming together of many different disciplines, all effectively partaking in the innovation process, which has the greatest influence. This means that the management of innovation per sé will become increasingly important as globalisation and competitiveness increase.

Innovation consists of many linear and non-linear processes, yet ultimately it has a beginning and an implementation or end. To represent every aspect of this process as well as possible, a model was constructed and can be seen in Figure C.2. The innovation/product cycle can be seen in the centre of the model, as represented by the three spheres. Each of these represents a distinct stage in the innovation cycle, by displaying the core process employed at that stage. Although the spheres are illustrated as separate entities, in practice they almost always overlap.

Like most business concepts, innovation does not consist of a singular process from beginning to end. It needs a very special environment or milieu to flourish. 3M proud themselves on the fact that they are one of the most innovative firms in the world. Through many interviews with senior as well as junior employees, their environment has been identified as one of the keys to their success.

In the model presented here, the innovation cycle (three spheres in the centre), is enclosed by a hoop, representing the three fields in the innovation milieu. We can see individual, organisational and external environment as the three fields, as well as divide them into many different aspects, influencing the innovation process individually.

For example: in keeping with 3M one of the aspects they employ to improve the generation of new ideas and creativity is a unique management process. Most employees are able to work on their own projects for some time every day. However the amount of freedom and responsibility every employee carries is quite striking. Each employee is regarded as an individual and restricted as little as possible by bureaucracy, giving rise to new-found freedom and a highly improved sense of creativity.

This example illustrates the importance of the organisational structure, the individual level of innovation as well as the profound influence each and every employee can have on the innovation process. To target another field in the innovation milieu, the external environment (see model) may be considered. Here aspects such as technology, market, social or economic factors play key roles and organisations need to realise their importance throughout the innovation process. The aspects in the external environment field are crucial in ensuring good contact between the innovation process and the real world outside the organisation.

The complexity of human needs, expectations and cognition can, however, increase the influencing aspects on the innovation cycle to infinity. Just as some chaos theory meteorologists believe the flap of a butterfly's wing may cause a hurricane, so may

Technological Innovation Model

Invention

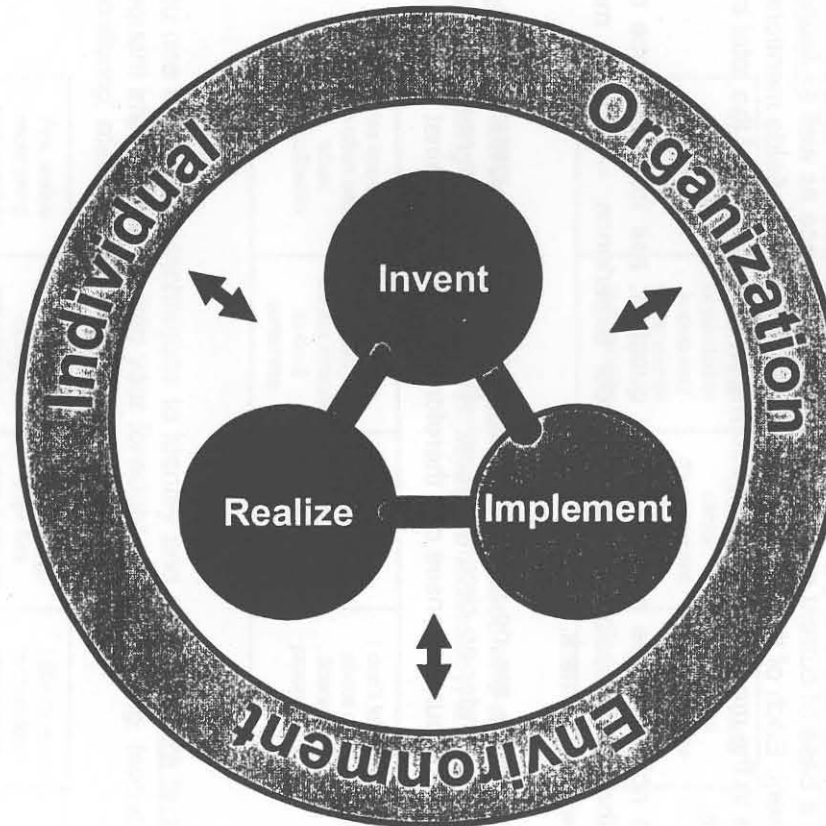
- Contact with Technology/Market
- Creative Idea generation/ Need recognition
- Find solutions to ideas — Random R&D, technology buy/license
- Development of solutions to demonstrateable format
- License inventions out or develop further.

Realisation

- Program initialisation
- Filter, prioritise, choose
- Resource
- Plan, specify
- Technology acquisition
- Design and develop to maturity
- Test
- Pre-production

Implementation

- Full scale production
- Market development/ customer development
- Innovation commercialisation/ diffusion
- After sales support



Individual

- Leadership
- Team working
- Networking/ communication
- Key individuals
- Individual development
- Creativity
- Human learning
- Different intelligences

Organisation

- Structure
- Vision
- Strategy
- Resources

Environment

- Market/ customer
- Technology
- Industry/ competitor
- Suppliers
- Political
- Social
- Economical

Figure C.2: Innovation Model, Proposed in Chapter 3

any minute occurrence influence the innovation process. To make sense out of such a situation would prove preposterous, and therefore this questionnaire aims at condensing the influencing aspects into high impact questions, able to detect problem areas, as well as possible recommendations toward improving them and shortening the total number of questions considerably.

For more information on the nature and goals of the questionnaire, see the end of this document.

The questions

- ♦ The following questions are based on the innovation milieu and should be answered in an honest as well as clear manner.
- ♦ Please answer the questions as you currently perceive your organisation and not as you would like it to be in the future. — The whole aim of the audit is to construct a base of current practices for future reference as well as foundation for improvement. Each of the sections correlates to the three fields mentioned above as well as in the model and therefore forms an intricate part of the total innovation procedure.
- ♦ If you do not know the answer to any question, ask for assistance or simply indicate the best possible likeness to your experience. — Please mark such answers with a “?” mark.
- ♦ Remember: there are no right or wrong answers in this questionnaire and it is totally private. Under no circumstances will any answers be revealed to superior personnel and your responses can therefore not be held against you.

Please start now.

INTERACTION WITH THE EXTERNAL ENVIRONMENT

Technology

1. Is dynamics of technological change a priority for strategic and general management, in deciding what new innovations to pursue, and where the company is heading?

Yes, always	Often	Sometimes	Almost never/ not yet
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2. Is there an ingrained knowledge throughout the organisation of key technologies and how they contribute towards strategy and core competencies?
(*Key technologies are those which the organisation's bottom-line depends on, with the greatest influence on efficiency, capabilities and are process oriented, or improve development.*)

Yes, almost everyone	Most of the organisation knows and understands our technologies	Probably only senior management knows this	I don't know our key technologies or how they contribute
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3. Is licensing of technology, in and out, actively pursued and are the criteria clearly stipulated? (*selling patents, licensing in (buying) of technology, licensing out (selling) of technology*)

Yes licensing is often used when applicable	Licensing is used only if we are unable to do it ourselves	Licensing almost never used + criteria unclear	I don't know about our licensing procedures
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4. Do you use exploratory techniques to identify and predict future technologies for subsequent implementation into your foresight program? (*e.g. technology scanning and monitoring, scenario analysis and Delphi*)

Yes, active monitoring and scenario planning are done in conjunction with the organisational strategy	Changes are being implemented from technology scan with some positive improvements visible	A technology scan has been done yet nothing changed	Little or no technology scanning is done
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5. Do your broad organisational technology trajectories (as outlined in the strategy for future development) foster innovation?

Strong scientific R&D components + long term technology development	Some scientific and unique research yet most emphasis on scale	Future technologies focus on cost cutting and reengineering	I don't know about our future technology needs
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Market and Customer

1. Is there an intimate knowledge of the market/customer and its needs, preferences or demands with every person involved in new projects/innovations? (Each function, from R&D, to design, to manufacturing, to after sales service, knows the needs and preferences of customers and how this product will satisfy them? "These guys really thought before designing this!" "This is a well designed product!" "This is beautiful and so useful, it's just what I needed".)

Yes, there is an intimate knowledge built through personal contact and observation of product use	A strong knowledge of market needs exists, yet products sometimes miss expected markets or initial user needs	Customer needs difficult to translate to actual work done in organisation	Market not yet well identified, yet information from marketing agency used extensively
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2. How strongly does the market/customer influence the characteristics, introduction price, operating procedures and final outcome of the project? (Does the customer have a say in the features of the product, its safety, its reliability and its "looks". Does a feedback system exist for customer comment on current products?)

Customers part of development team, as well use of screening with customer groups	Customer needs and preferences used throughout development, yet little direct contact between project team and customer	Customer input used, yet often irrelevant since customer doesn't know what he/she wants	Market needs used as identified by marketing department
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3. Are criteria for market/customer development clear? (Is the market developed before launching a new product; is advertising or similar development techniques used effectively.)

Strong market development with design and R&D giving input to marketing	Some market development done by advertising and personal contact with customers	Little market development done, just product advertising	Little or no market development is done
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4. Is the development capability of lead users (consumers that usually buy the first of almost everything) fully exploited? (These consumers can give valuable critique on the product when in final development stage, since they usually have a good technical knowledge. E.g. Netscape launching a beta browser version and asking the lead users to find any bugs.)

Yes, lead users are identified and used extensively	Some preference made between customer test groups with emphasis on technical and non-technical people	Customer test groups are identified at random	No lead users are identified
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5. Do you use exploratory techniques to identify and predict future market trends in line with the strategic foresight of the organisation? (e.g. market positioning and trend analysis, scenario analysis and Delphi)

Yes, active monitoring and scenario planning are done in conjunction with the organisational strategy	Correlation between strategy and market analysis with some benefits starting to occur	Market analysis is done, yet it is not linked to strategy	Little or no future market analysis done
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Industry

1. Do you encourage suppliers to develop their systems and products to deliver a higher quality and overall better product to you? *(Strong relationships between you and suppliers can improve delivery, quality, price, and add to the total value chain)*

Yes, direct contact and deliberation on new products with emphasis on best supplier possibilities	Lots of encouragement as well as pressure	Some encouragement	Little or no contact with suppliers on such issues
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2. Are your motives for collaborating with other companies in the industry made explicit, and related to subsequent outcomes? *(Do industry work groups exist to develop certain basic needs for the industry. — e.g. Japan's industries stand united against the world, yet compete fiercely on national level.)*

Yes, direct contact and collaboration with clear motives and outcomes	Lots of collaboration	Some collaboration	Poor relations with competitors and other role players
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3. Is benchmarking used in your industry on a national and international scale? *(how does your organisation compare with the best in the world)*

Yes, regular benchmarking used nationally and internationally	Regular benchmarking used	Some benchmarking used	Poor relations with competitors and no benchmarking used
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4. Compared to your competitors, does a strategy exist that will result in your ultimate leadership in the industry (niche), through development and innovation? *(secrecy, accumulated tacit knowledge, product complexity, complementary assets, learning curve, standards, patents, lead times and product support)*

Yes, our strategy takes competitors into account and will try to lead to leadership	Some competitor trends included in strategy	Knowledge of competitors, yet their development not included in strategy	The competitions strategies are not known, neither is our own future development
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5. Do you learn from the competition, and is competitive intelligence used? *(R&D and reverse engineering, licensing, hiring, information collection)*

Yes, good intelligence of competitors available and is used as learning tools	Regular intelligence and learning activities are undertaken	Some competitor intelligence available	No or little knowledge of competitors
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Political, Economical and Social

1. Do you specify and communicate your education and training needs to local and leading providers? (*Universities, Technicons, or NGOs*)

Yes, continuous contact with short courses and research programmes	Regular contact yet little input or direction given	Some contact no input	None or little contact with such institutions
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2. Are all parties influential to new projects or innovation, captured by your information network? (*national and international "gurus" in the political, environmental ("green"), economical, social and government arena*)

Yes, continuous contact with strong benefits	Regular contact and some benefit derived	Some contact little benefit	None or little contact with such parties
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3. Do your links with government provide early warning of relevant regulation, promotion and mechanisms that would have a positive or negative impact on your organisation?

Yes, many links with strong benefits	Many links with some benefit derived	Some links exist	Little or no such links
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4. Are potential advantages, that may derive from the national environment, effectively used and implemented? (*Tax breaks, special development areas, science base, input prices, workforce skills, market demand, support industries, and other.*)

Yes, all available advantages are employed	Many advantages used	Some advantages used	Don't know of any
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5. Is action being taken to benefit from foreign systems of innovation? (*Foreign investment, joint ventures and alliances, trade agreements, suppliers and customers, licensing, reverse engineering, public research*)

Yes, all available advantages are employed	Many advantages used	Some advantages used	Don't know of any
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ORGANISATIONAL

Strategic

1. Does an active foresight programme exist, looking five to ten years into the future, complementing the strategy in reaching the future of your organisation?

Yes, foresight and strategy, shape our future focus	A foresight study has been done	Some future planning is done	Don't know of any
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2. Are new generation products and technologies planned and developed in accordance with your foresight and strategy formulation? (*number of new generations of products planned in advance*)

Yes	Most new projects are strategic and in accordance with the foresight	Some projects are strategic	No or I don't know
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3. Does the overall foresight and business strategy, link with innovation and innovation management throughout the organisation? (*Are clear goals for innovation set, and is innovation seen as a method for gaining a competitive edge over competitors.*)

Yes, mostly	In certain cases	Marginally	No or I don't know if it does
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4. Is the correct structure for a particular innovation determined, be it tiger teams, multi-disciplinary teams, functional participation, or matrix based, with strong leadership and early involvement by future members of the chosen structure.

Yes, best possible team structure chosen with early participation of all functions that are present in the team throughout the innovation lifecycle	Task team as well as good concurrent engineering practices	Some flexibility with better involvement of innovation parties	Only one formal structure with functional participation as project reaches each stage in the lifecycle
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5. Do you clearly identify potential new company technological competencies — corporate visions, technical judgements, product-technology matrices, incremental trial, error and learning?

Yes, all available advantages are employed	Many advantages used	Some advantages used	Don't know of any
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Implementation

1. Is your organisation able to extract the ultimate amount of advantage from available resources, and previous experiences? (*Learning (project review) and realising new possibilities for current resources, can significantly reduce a organisation's overhead costs i.e. Japan*)

Yes	Mostly	Sometimes	Not really
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2. Do new innovations/ventures have a balanced repertoire of Product Development, Production, and Distribution? (*If compared to a three-legged chair, if any one is not present, consequences can be disastrous.*)

Yes	Mostly	Sometimes	Not really
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3. Is there a measure of elapsed time from the first funding of a new development/innovation, and the time it has been recovered through market sales? (*Time for ROI*)

Yes, clear metrics and measurements for new developments are in place	Mostly	Sometimes, yet generally little track is kept	Not really
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4. Is there early involvement (while still planning) and concurrent working by as many functions as possible, within the new product development system?

Yes	Mostly	Sometimes	Not really
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5. Are there formal procedures for reviewing new product development progress against a series of stage 'gates' throughout the innovation lifecycle?

Yes	Mostly	Sometimes	Not really
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Fostering Environment

1. Do career structures and skill improvement courses, include learning about creativity, core competencies, technology and innovation and how to implement them practically in each employee's working environment?

Yes, almost all employees learn of these concepts	Most management people	For some employees	Not that I know of
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2. Are key individuals identified, advertised, recognised and supported by management, to make the necessary information and experience available to entrepreneurial employees, in your organisation?

Yes, we have an active key peoples network	Mostly	To a certain degree	Not that I know of
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3. Is your organisation capable of actively learning, as well as learning faster than competitors, from each new product innovation, even if the innovation was unsuccessful?

Yes	Mostly	Sometimes	Not really
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4. If a new product fails, is there a feeling of total dismay and hopelessness concluded in shutdown of the project, or does quick learning occur from the experience, followed by renewed vigour for succeeding and making the project work better? *(Few first innovations are immediate success stories. New product market expectations are always difficult to judge, and the only way is by actually launching a product and learning from the reaction.)*

Yes always	Mostly	Sometimes	Not really
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5. Does management or leadership expect innovation and creativity, and strives to create a truly friendly environment for new ideas and expectations to be discussed and pursued?

Yes, management leads the way through excitement and example	Innovation expected, rewarded and fostered but not by all	Innovation expected but little done to create the environment	Not really
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6. Does a flexible incentive scheme exist, with rewards that have real influence on employee innovativeness? *(Base pay with bonus opportunities doubling or even tripling the base salary)*

Yes, a good formal and informal incentive schemes exist	A formal innovation scheme exists	Year-end bonus scheme exists	Not really
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INDIVIDUAL

Personality and Feelings

1. If you win the lottery tomorrow with a total prize of \$10 million, would you?

Invest the money and continue working	Take a long vacation but stay on in your current position	Resign after completing immediate tasks and responsibilities	Immediately resign and do whatever you like
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2. Do you feel compelled to be as creative as possible when solving problems, or starting with a new project? (Do rules and regulations exist limiting your creativity or inhibiting controversiality.)

Yes	Mostly	Sometimes	Almost never
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3. Do you as an individual experience the strategic goals of your organisation (as set by the foresight and strategy of your organisation) as motivational?

Yes	Mostly	Sometimes	Not really
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4. When pursuing or suggesting an innovative avenue, do you at any stage feel threatened (promotion wise, to be showing disrespect, being ridiculed, feel foolish, seem to be naïve, fear of failure, not wanting to stand out, being branded as different, or losing social standing) by management or colleagues?

Yes, I often feel threatened in some way	Many times especially in the company of superiors	Sometimes	Not really, the culture is very open and most things go down well
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5. Do you as an individual feel like you are making a significant contribution to your organisation's strategic and foresight goals, or do you feel like a cog in a huge machine?

Yes, I often feel significant	In many projects I have felt significant	I sometimes feel significant	Not really
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Knowledge, Intelligence, Experience and Background

1. When starting a new project, are you and your colleagues made aware of the common goal for the project, as well as the significance to the organisational strategy? (common goal = total project goal = successful market penetration = reaching planned strategic future)

Yes, always	Mostly, depending who is involved	Sometimes, yet depending on who is involved	Seldom or not really
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2. Are you creative in new projects or do your years of experience inhibit crazy ideas, - possibly childish or ridiculous? (Do you use creative techniques in your own work and in group situations?)

Yes, I always try	Mostly, if time allows	Sometimes, depending on the project	Seldom, I just try to finish the project on time in 'spec'
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3. Do you often study inside and outside your field to improve your knowledge base, enabling you to adopt different approaches, when solving problems? (Self motivation to grow and learn)

Yes, I try to broaden my knowledge on many aspects	Mostly if time allows	Sometimes	Not really
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4. Are you aware of the key people (champions, gatekeepers, entrepreneurs, mentors) in your organisation to contact if a new idea occurs to you, even if it is completely outside your department's field of expertise?

Yes, I know all the key people and how to get in contact with them	I am aware of most key people	I am aware of some key people in my department	Not really
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5. Do your family and home environment support you in entrepreneurial efforts you make at the office, even if it may result in a negative outcome?

Yes, my family is part of my work and is prepared to adjust as I am for them	Mostly	As long as the changes does not impact to severely	Work and home does not mix
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Social Environment

1. Do you have a relationship of communication and understanding with at least one person in each of the functional departments of your organisation?

Yes, I have a relationship in each of the functions and it always broadens my perspective when discussing new projects with them	I know most relevant people in the different functions	Some relationships, yet they are not specifically in certain departments	Not really, I am not that social
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2. Does a spirit of innovation and dedication prevail throughout your organisation, recognising and celebrating employees brave enough to propose new innovations or whom are creative and resourceful in their daily tasks?

Yes	Mostly	To a certain degree	Not really
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3. Is it possible that everybody in your organisation essentially thinks in the same way (is the workforce predominantly engineers/ economists/ lawyers/ doctors) or are diverse thinking really present? *(Do most employees follow and agree with the leader or manager and form a sort of herd around a single person, without giving their opinion, or sometimes not even having an opinion of their own?)*

Yes, it is quite possible	It is mostly possible	To a certain degree, yet we are quite diverse	No, we are an extremely diverse group of employees, ranging from many different countries, as well as occupations
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4. Are there any mavericks or 'weirdoes' in your organisation, and are they sort of accepted in the social structure of your organisation. *(They are often catalysts for different thinking and breaking the herd mentality)*

Yes, mavericks are purposefully hired and made to feel welcome, as any other employees	Some mavericks are hired, yet they seldom fit in	Most new employees are hired to fit in, yet the few who slip through, are accommodated	Not really, no weirdoes
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5. Is there a person or persons in your organisation that tells and embodies powerful and purposeful stories, with the aim of imbedding in the identity of the organisation's past legends, faiths, myths, and stories relating to innovative activities and highly successful past and future activities?

Yes, we have many storytellers	Some do exist, yet their value are not recognised by management	Few active story tellers, but stories in the form of rumors do occur	Not really
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Please answer the following

Does the audit, to your experience, cover every aspect crucial to the innovation process?

If not, please list any fields you think are important, but not represented in the questionnaire.

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