

Management of NPD Assessment – Creating the Design Brief

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Scenario

I am the New Product Development (NPD) and Innovations Manager of Welshpool based SME who specialises in the Manufacturing of Electronic Breathalyzer systems. In the light of the recent worldwide Coronavirus pandemic (COVID-19).

I have put together the following design brief which will be shared within the company with key stakeholders of departments as the company has identified a great opportunity to develop a product and wish to bring this to market as soon as possible. It is believed this can meet both clinical and personal requirements for such virus detection. To be early to market on a vital detector system following the disastrous impact the virus is having on the worlds health proves the importance of this NPD project and the huge potential impact to the company and the people when most business have been heavily impacted such as closures of workplaces, decline in sales and risk of loss of employment.

Brief will be shared with the following – CEO, Designers, Production, Engineering Finance, Sales & Marketing and Despatch & Logistics.

“The objective of design is to meet the needs and expectations of the customers. Good design then starts and ends with the customer” (Paul Trott, 2016)

- A) Synopsis
- B) Social
- C) Political
- D) Environmental
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- S) Manufacturing Facilities
- T) Engineering

- U) Documentation
- V) Performance
- W) Marketing
- X) Prototyping/Testing
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A) Synopsis

- Operating from our purpose-built manufacturing site in Welshpool Mid-Wales.
- Specialising in the field of Breath Alcohol analysis, in particular Breathalyzers.
“Increasingly, innovation is achieved by companies looking outside their boundaries for knowledge and expertise, rather than relying on internal R & D “ (Piercy, 2009)
- Already have customer base and relationships in place with contacts and contracts from existing business to benefit this project.
- The key resources with strong experience of using Breath detection for testing.
- Manufacturing process and procedures already in operation.
- Predicted 750,000 units in Year one.
- Projection of three million units afterwards.
- Must be quick to market, with an agreed timescale within the next 6 to 12 months.
- Focus on end user, being affordable and easy to use.

B) Social – Ensure that tests are effective, accessible and acceptable to the communities they serve.

- Accessibility - Ensure that the tests are accessible to all segments of the population, including vulnerable. Consider issues such as affordability, availability of testing centres and transportation for those who may not have easy access.
- Language barriers and communication - Provide information and instructions in multiple languages. Effective communication is critical to ensure that people understand the importance of testing, how to get tested and what to do with the results.
- Privacy and Data protection – Safeguard individuals' privacy and personal data. Ensure that test results are kept confidential and that data is used only for public health purposes, not for other purposes like immigration enforcement.
- Raising awareness and Education - Conduct public education and awareness campaigns to inform people about the importance of testing, the testing process, and what actions to take based on the results. Address misconceptions and provide accurate information.
- ‘Emergency briefings - be prepared to adapt testing strategies and communication approaches during rapidly changing situations, such as surges in cases or the emergence of new variants. Clear and timely communication is essential during crises.
- Receive feedback from the community and adapt testing strategies based on their needs and preferences. Flexibility is key to responding to evolving circumstances.

C) Politics - it's essential to consider political considerations, as they can significantly impact the success and feasibility of a product.

- Regulatory - Understand the regulatory landscape in the regions where you plan to launch the product. Different countries may have varying regulations regarding product safety, labelling, data privacy, and more. Ensure your product complies with these regulations to avoid legal issues and fines.
- International trade agreements and Tariffs - If your product involves international manufacturing or distribution, consider trade agreements and tariffs. Political shifts in trade policies can impact the cost and logistics of your product.
- Be aware of the procurement process, bidding requirements, and compliance standards. Government contracts can be lucrative but are subject to strict rules and scrutiny.
- Data privacy regulations (e.g., GDPR in Europe or HIPAA in the U.S.) ensuring your product is compliant with relevant data protection laws.
- Environmental regulation concerns are becoming increasingly political. Consider how your product aligns with regulations aimed at reducing carbon emissions, waste or other environmental impacts. The top of net zero.
- Labour laws regulations for manufacturing including minimum wage, working conditions, and employment rights.
- Political and social views can affect public perception. Consider corporate social responsibility (CSR) strategies to align your product with positive social and political values.
- Develop a crisis management plan that addresses potential political crises or controversies related to your product and be prepared to communicate effectively with stakeholders.

D) Environmental - as they help ensure that products are sustainable, minimize their ecological footprint, and adhere to responsible manufacturing practices.

- Conduct a comprehensive Life Cycle Assessment (LCA) to evaluate the environmental impacts of the product from raw material extraction through manufacturing, distribution, use and disposal. Identify areas where environmental improvements can be made.
- Choose materials that have a lower environmental impact. Consider factors like recyclability, biodegradability and opt for materials with a smaller carbon footprint.
- Energy Efficiency Design the product to be energy-efficient during both manufacturing and use. Minimize energy consumption.
- Reduction of waste - Aim to reduce waste at every stage of the product's life cycle. Use design strategies such as modular construction to facilitate repair and recycling.
- Packaging usage - minimize excessive packaging and choose materials that are recyclable, biodegradable, or reusable. Consider packaging reduction and eco-friendly alternatives.
- Distribution channels - Optimize the product's design and logistics to reduce transportation-related emissions. Consider sourcing materials locally and designing for compact packaging to minimize shipping impacts.

- Considerations for end of life - Plan for the product's end-of-life management. Ensure that it can be easily disassembled for recycling or safe disposal. Explore opportunities for product take-back programs or recycling initiatives.
- Recyclability and circular economy - Design products with recycling in mind. Use materials that are easily recyclable and design for easy separation of materials. Embrace the principles of the circular economy, such as reusing components or materials in future products.
- Ensure that the product does not contain hazardous chemicals that can harm the environment or pose risks to human health. Comply with regulations like REACH in Europe.
- Certifications and Standards Adhere to environmental certifications and standards such as ISO 14001 (Environmental Management System)
- Measure and reduce the carbon footprint of the product by using carbon accounting tools and by adopting strategies to reduce emissions, such as using renewable energy sources.
- Collaborate with suppliers who demonstrate environmentally responsible practices and transparency in their supply chain.
- Stay informed about and comply with environmental regulations and standards applicable to the product in the regions where it will be sold.

The attention these days on the impact to the environment is massive, with targets being set on net zero by businesses. As quoted by Joe Tidd “Innovation is often presented as a major contribution to the degradation of the environment, through its association with increased economic growth and consumption. However, innovation can also be large part of any potential solution to a range of environmental issues” (Joe Tidd, 2018)

E) Legal/IP – consideration to protect our ideas, designs, and innovations.

- Consider applying for a patent to protect our invention for any unique and innovative features or technology. Patents can be valuable assets that grant exclusive rights to make, use and sell your invention for a limited time.
- Ensure that we have the appropriate copyrights in place.
- Register any relevant trademarks for your product name, logo, or brand to protect your identity and prevent others from using similar marks.
- Non-disclosure agreements (NDAs) for if we share our product design brief with manufacturers/suppliers or investors ask them to sign NDAs. NDAs legally bind parties to confidentiality.
- Draft clear contractual agreements with designers, engineers, manufacturers, or suppliers. Within these outline supply, delivery, period, prices, payment terms, and IP ownership etc.
- Consider purchasing insurance to protect against infringement claims, equipment damages or other legal issues.
- Keep thorough records of your product design and development process. These records can be invaluable in proving ownership and defending your IP rights in case of disputes.

F) Key points for this project – These are what I feel is why we need to act quick and find a solution for this with the scale of the opportunity we have. Innovative project as a chance to ‘exploit change as an opportunity for a different business or service” (Peter Drucker, 2012)

- Scale of global pandemic is worldwide and a matter of urgency to all.
- Lack of testing equipment available.

- Big market to go after for Sales/profits.
- We want to be first to market to offer a quick solution to testing.
- Existing methods of swabbing is not a pleasant experience for individual.
- Improve time delay to find out results.
- Current tests can be void.
- Prevent further spreading and deaths.
- Need to be affordable with costs concerning everyone.
- Requires to be lightweight and portable for daily use.
- User friendly for all abilities and ages.
- Equipment in factory adaptable

G) Types of Viruses – the coronavirus has had numerous different variants. This is where we have to continue to develop and adjust to new variants.

- Please note that the situation regarding COVID-19 variants is dynamic and new variants can emerge over time.
- Scientists and world health organisation's continue to monitor and study these variants to assess their impact on transmission, severity of illness and vaccine effectiveness.
- Alpha was first identified in the United Kingdom; this variant was associated with increased transmissibility. It had several mutations, including changes in the spike protein.
- Beta was first identified in South Africa, the Beta variant had mutations in the spike protein and was associated with potential resistance to neutralization by antibodies.
- Gamma originally identified in Brazil, this variant shared some mutations with the Beta variant and raised concerns about increased transmissibility and potential immune evasion.
- Delta initially detected in India, the Delta variant gained widespread attention for its increased transmissibility and potential to partially evade immunity. It became one of the dominant variants in many parts of the world.
- The Omicron variant was first identified in South Africa in November 2021. It had an unusually large number of mutations, particularly in the spike protein. This raised concerns about its potential to evade immunity and led to global efforts to monitor and study its characteristics.

H) Sourcing of Materials – a brainstorm on what needs to be considered what we go about sourcing the materials to our new detector system?

[Procurement strategies in the healthcare industry | Procurement Magazine](#)

During covid the above link refers to shifting from cost driven procurement to value based procurement.

- Is there any materials we currently buy, stock or previously purchased that would be a use for this device to save time, money and reduce inventory?
- Of the Materials we use, is there any form of adaptation that could offer the outcome we require?
- Using the projected numbers, what does this equate to in terms of buying quantities.
- Does a new source of supply need finding and how will we go about this?

- If taking from existing suppliers, can our supplier handle the increase and projected volumes?
- Is it risky to use existing supplier as they could take the idea and sell to competitors?
- What is the downward spend for inventory?
- What timescale Lead time is needed to hit a realistic launch date?
- Further down the line, do we need to consider Trials first.

I) Consumer Base – Who we do want to buy this device? Ultimately, it's the end user, the consumer who this is targeted at of all ages and abilities. Below breaks down outlets of opportunities:

- Authorities and forces for government mass contracts, this would include border force and police.
- Health professionals and Hospitals across nations as a lot purchase individually or group of locations.
- Any size Businesses looking to safeguard staff and site from the dangerous virus. Especially those who employees work in close contact or with high touch points like manufacturing.
- Education sector, schools can spread the viruses rapidly with all the families and different communities children can come from. Some children are not aware of the risks and may not act as required.
- Care homes for the elderly, these residents are vulnerable and high risk.
- Airports and other forms of travel hubs with the mass of people even with the huge reduction in travel.
- Retail stores for sales.
- E-commerce is a superb method to distribute large numbers with people not needing to leave their homes.

J) Scale of the potential sales – with a lot of this being unknown but a best guess. “There is a well-established debate in literature about the relative merits of market pull versus technology push strategies for new product development.” – John Bassant (2005)

- Predicted sales of 750,000 units in year one.
- Projected 3 million per year afterwards which is a significant jump.
- Wider expansion into Europe and other countries if ensure tick the regulations of them.
- What does this mean for the business profits
- Impact to peoples life with job security

K) Activity of rivals/competitors – “Innovation is essentially a competitive search for new or different solutions – whether in the sense of commercial enterprises competing with each other for market share or in the wider sense of public service, where the competition is for

doing more with limited resources, or between law and order and crime, or education and illiteracy. “ (Joe Tidd and John Bessant, 2009)

- Are our competitors doing anything in the light of the pandemic to challenge our project.
- Identified our current rivals that use breath detection in our field of breathalysers.
- Looked into their pages to be if any clues of developments.
- Spoke to suppliers in our industry discreetly to see if can get a glimmer of any developments.
- Research the internet, social media and news channels in the UK and abroad if any activity.

L) Appearance – How do we want the device to look?

- What shape to make the device?
 - Where will it be stored? Handbags, pockets, shelves etc
 - Size requirement for internal components.
 - Best fit for collation box for transport
 - Bigger enough not to get lost easily.
 - Simplicity for manufacturing process.
 - Square, rectangle or circle shape best for device all to be considered.
- Result screen/window – “traditional literature on industrial marketing has a bias towards relatively low-technology products, and has failed largely to take into account the nature of high-technology products and their markets” Joe Tidd and John Bessant, 2009)
 - Digital reading is this necessary and worthwhile for the test required.
 - Colour or black and white
 - Way of reflecting outcome
 - Red colour positive associated with danger or warning, similar to LFT line (Lateral flow test)
 - Position on device to reflect outcome, top/Middle or bottom. Other tests like pregnancy and LFT do the middle.
 - What size should this be? Consider those with eyesight difficulties.
- Colour – how important is this?
 - Simplicity for manufacturing process.
 - Eye catching
 - Consider colour to avoid getting lost easily.
- Outer Material
 - Metal can appear sharp.
 - Metal can appear heavy.
 - Provides peoples early thoughts on strength.
 - Some outer materials have more options linked to colour etc.

M) Product Data

Weight – A very important factor to be consider as for daily use people.

- End user considerations – set to be used by all ages and abilities, must think about different strengths etc.
- Storage locations of full pallet, like racking restrictions and Forklift truck limits that customers may have.
- Consumer likely ways of storing – handbags, coat pockets etc.
- Impact of excess weight
 - Reduced quantity per box, increase cost per case.
 - Reduced quantity per pallet for distribution.
 - Increased procurement demand
 - Recycling/waste tonnage for disposals.
- Life
 - Period of time
 - What would consumers expect?
 - How long breathylser battery lasts for to compare and review feedback on existing product on the market.
- Type
- Disposal/Environment
 - Certain batteries receive bad press, not what I wanted.

N) Waterproof – Impact of water damage could have on the product?

- Would it effect the battery performance?
- Screen and results reading damage.
- Risk of being electrocuted.
- Cost to those having to rebuy if damaged by water during challenging time financially for so many people and families.
- Extra cost on material sourcing.

O) ERP System set-up (Enterprise resource planning)

- Nominal coding for accounts.
- Stock code for finished good item.
- Codes for new raw materials
- Bills of materials capturing all components
- Built in scrap percentages on components.

P) Packing/Despatch – What is the best use of our available machinery, storage, resources to control the picking of this product.

- Quantity per box
- Quantity of boxes per layer
- Quantity of layers and boxes per full pallet
- Method of putting into a box, online equipment, manual labour resources for packing
- Picking lists that makes sense to despatch.
- Batch code recording for traceability.
- Countersign documentation to ensure task completed right first time.

- Storage conditions making sure suitable for product and not in area which can get dusty, wet or damp impacting the final product. As likely to be stored in cardboard outer cases/boxes this can cause stability issues when in transit.

Q) Logistics/Distribution – important to distribute the finished product successfully to customers in one piece to avoid any additional costs, customer complaints and damages to reputation.

- Are transit trials required or can this mirror known successful pallets configurations.
- Best way to send out.
- E-commerce and Amazon challenges.
- Delivery notes

R) Minimum order quantity – ensuring the business makes money, what is the minimum order quantity we can accept.

- Run costings to understand bottom profitable despatch quantity with requirement margin.
- Revert back to target bulk consumer base and on magnitude of business set MOQ for them individually.
- Consideration for point R with types of distribution used.

S) Manufacturing Facilities – is our facility efficient, safe and capable of producing this high-quality product.

- Location for the plant and, consider its proximity to suppliers, distribution channels, and the availability of skilled labour.
- Plant Size and Layout to accommodate production processes, storage, offices and other necessary spaces.
- Consider future expansion.
- List the types of machinery, equipment and technology needed for manufacturing processes.
- Is automation or robots available to reduce costs and improve efficiency.
- Is the workflow sufficient for raw materials in and finished product out.
- Outline the logistics and transportation requirements for receiving raw materials and shipping finished products.
- Does the site have the IT infrastructure and communication systems needed for managing operations, data collection, and monitoring.
- Risk Assessment to evaluate potential risks and mitigation strategies related to factors like natural disasters, supply chain disruptions, and market changes.

T) Engineering – vital to maintain the equipment to keep up with desired output.

- Consider energy-efficient design elements, such as lighting, HVAC systems and insulation, to reduce operating costs and environmental impact.
- Plan for routine maintenance and repairs of machinery and infrastructure.
- Specify the availability of spare parts and maintenance schedules.
- Planned maintenance records update for audits.
- Engineering manuals
- Service histories

U) Documentation –

- Production specification, Outlining the key features, tolerances, dimensions, and performance criteria.
- Planning schedule, detailing requirements, timings and steps within manufacturing process.
- Quality control checks covering off inspection criteria, testing, traceability, tolerances and retained samples.
- Procedures for conducting required workstation testing ensuring quality standards are achieved.
- Certification of conformance to cover that complies with standards and regulations set by the company, auditing bodies etc.
- Compliance documents that meet regulatory standards including Health and safety data sheets.
- Material safety data sheets (MSDS) for all materials and chemicals used in the manufacturing process.
- Supplier agreements covered off previously outlining deliveries, payments and T&C etc.
- Logistics and despatch records covered off above.
- ERP data including bills of materials and purchase orders.
- Certifications that meet the requirements to export
- Traceability sheets across components and into batches of the final product.
- Environmental documents including sustainability highlighting efforts for energy saving, reduction in manufacturing waste and carbon emissions.

V) Performance

- Speed – a key focus to the performance of this detector
 - Set up and reading of instructions time consuming.
 - Reduction in set up
 - We wish to get results back within 5-10mins, which would be less than the current market testing kits available.
- Sensitivity to the Virus
 - Varied strengths of the virus need picking up
 - Look to avoid questionable test results.
 - Clear cut results of positive or negative no faint results.

W) Prototyping/Testing - The prototyping will be handed to a company in London using “A holistic approach driven by effective cross-functional teams” (Edgett, 2005), for this to be successful we must have strong communication with them and raise any concerns or view points. Once a new prototype is delivered, a full list of testing needs to be conducted.

- Testing schedule – to ensure smooth testing
 - Outline a schedule and share with the relevant parties
 - Outsource testing to a third party if required but must understand timings.
 - Comply with budget and resources allocated.
- Safety tests – number one for all, the product must not put anyone at risk.
- Cross reference to measurable targets such as performance, weight etc.
- Look to cover as much as possible to avoid wasting time, resources and money.

- Can utilise the ‘Pearsons Uncertainty map’ during this process to analyse results. (Pearson, 1991)

X) Marketing – “Marketing can provide the necessary information and knowledge required by the firm to ensure the successful development of innovative new product and the successful acceptance and diffusion of new products.” (Paul Trott, 2016). It's essential to provide clear and comprehensive information to ensure that the design team understands your goals, target audience, brand identity and messaging.

- Brand Identity maintaining its values and mission statement of company.
- Use of company logo usage, colour trends any specific design elements that must be incorporated.
- Share insights or data about your audience's preferences and behaviours from marketing research.
- Outline the core messages we want to give out with the new innovation.
- Highlight any specific messaging points, taglines, or slogans that should be featured prominently.
- Share information about your competitors and their marketing strategies.
- Indicate what sets your brand apart and how you'd like to position yourself in the market.
- Clearly state the objectives of the marketing campaign or project.
- Specify measurable KPIs that will be used to evaluate the project's success.
- Identify the marketing channels where the design assets will be used (e.g., social media, print ads, website). From a quick search online, this page supports the positive impact on sales social media has on sales. ([Social Selling: Increase Sales on Social Media | Digital Marketing Institute](#))
- List the specific marketing aids required such posters, banners, social media graphics, brochures.
- Is new content required like photograph.
- Mention any legal or industry-specific requirements that the design must adhere to like FDA (Food and drug administration) which is relevant for health care. [What We Do | FDA](#)

Y) Quality/Technical input – Quality aspects are built up not only by quality department, input from Human resources, production and engineering are among the many factors included. As quoted by Feigenbaum in 1986:96 “An effective system from integrating the quality development, quality maintenance and quality improvement efforts of the various groups of an organisation so to enable production and service at the most economical levels which allows for full customer satisfaction. (Feigenbaum, 1986)

- Technical constraints and feasibility are important to be noted including any limitations or constraints related to materials, manufacturing processes, or technical specifications. For example, if certain materials cannot be used due to safety concerns, this information should be raised beforehand.
- Specify any quality standards or benchmarks that the product must meet. This can include durability, performance, reliability, and other quality-related metrics.
- Describe the testing and quality assurance procedures that the product will undergo during and after manufacturing.
- Offer recommendations for materials that align with quality and performance goals. Mention any preferred suppliers or materials that should be considered. This is part of the supplier approval process which will include company history, accreditations etc.
- Provide insights from a quality perspective into how design decisions may impact manufacturing costs. This can help the design team make informed choices to stay within budget.
- Handling customer complaints and feedback to feed this back into design team, management and operations.

- Outline the steps and procedures for quality control throughout the manufacturing process. Specify who is responsible for quality checks and inspections.
- Follow up testing, arrange for third party to conduct any supportive testing additional to onsite, production and laboratory testing conducted if necessary.
- Specify the documentation that should be created and maintained throughout the design and manufacturing process. This can include technical drawings, specifications, and design change records.

Z) Bibliography

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