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The Development of an NPD control document:

The Product Design Brief

Synopsis of the Chemical analysis Device and its potential as a new product development

This design brief outlines the current and ongoing research and development of a new technological development based on developing our current Breathalysers technology and market base.

The design brief considers all areas of the business and the key areas that need to be considered before a strategic decision is made by the Senior Leadership Team, based on evidence and researched concepts. The design brief also considers the research undertaken with the University and the requirements that the partnership require to be considered.

The device is to be placed in the market as a **Healthy Living / Illness Prevention Solution**

The device will be a portable chemical analysis device (CAD) that can be used in a range of public environments building upon our tried and tested technology within Breath Tests products.

The device will be able to with 100% accuracy, quickly detect and analyse a range of defined contaminates from the breath of a human being.

The device will be user friendly and with a clear and intuitive interface design so as not to produce false negative results.

The branding for the device will portray a clear message of health and well-being, in all aspects of design.

The packaging of the product will reflect the overall branding, with a clear focus on sustainability linked to the branding message.

The device will be considered as a leader within the circular economy linking customers into key message of recycling, so secondary marketing building on health and well being for the planet.

The device will be handheld size that can fit into the palm of the hand for ease of use, with user friendly Aesthetics, in a range of colours.

The device will be made from metal with aesthetics that allow for smooth operation in an outdoor environment.

The device will be subject to a continuous improvement lifecycle to drive higher quality through understanding design challenges.

The projected manufacturing volumes in the first year is likely to be no more than 750,000, potentially 3 million per annum afterwards.

The design budget will be determined by senior leadership team considering key areas of potential market leading sales.

The final price will be set by the Senior Sales Manager on further consideration of the market entry points , but with a clear remit of at least 50% profit margin.

The device will be built to comply with the following international standards:

- IEC 60950 – Information technology equipment
- IEC 62368 – Medical equipment
- Restriction of Hazardous Substances
- WEEE Directives as determined.

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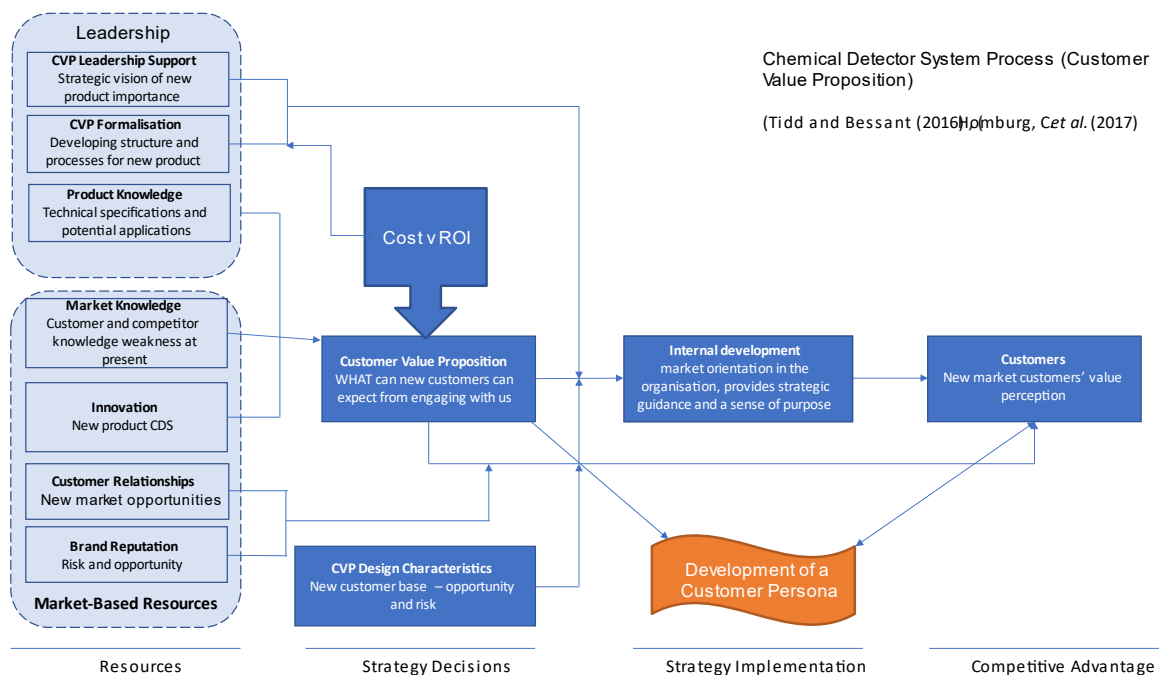
Customers Market Analysis

The New Market potential for the Portable chemical analysis device

As a business we have a strong but niche position within the current marketplace and in considering a new product or area for development, strong consideration must be given and aligned to our current customer base and our strengths as a business. The Business Model Canvas demonstrates that a core driver of our growth is developing greater and more insightful customer relationships, and that any new product must consider that wider impact on our current products, customers and also profitability, whilst demonstrating a real and new market opportunity

Within the design brief we have considered the need of current businesses and future opportunities through development of a customer value proposition (CVP) strategic tool. This has developed a proactive consideration of the new business opportunities in current and new markets to achieve lasting competitive advantages. Through this CVP we have considered additionally the ROI v Cost of new product development, and also looking at customer needs created a number of customer personas to test in detail customers' requirements for the new product

Each stage of the design brief has been considered against the customer requirements which has considered each key element of the design. Further detailed analysis is available upon request from the Marketing team.



The new areas identified as key future markets are:

- Aerospace – Partnership Model within the sector to provide international health assurances, through testing airborne virus (market circa £150Bn)
- Border Security – Testing of all immigration routes (market circa £247Bn)
- NHS – National Requirements of health and wellbeing (market circa £150Bn)
- International Health Care – first line defence against spread of virus airborne (market circa £500Bn)
- Defence – Adapted for Military Use within filtration systems (market circa £74.1Bn)
- Security – Large event management – health management (market circa £42Bn)
- Health and Well Being – Fitness Market, health and wellbeing, diet management, disease management (market circa £74Tn).

The design brief sets out the various requirements of the process required to bring the device to market, including any independencies, which may have a direct or indirect impact on the brief. The projected manufacturing volumes in the first year is likely to be no more than 750,000, potentially 3million per annum afterwards.

This is a controlled document under our quality control process and any additional data added must go through the formal Quality control change methodology. The NPD team must be informed of any changes through the relevant control document.

Cross References

- Branding – Must drive new customer growth through clear branding.
- Product Cost – competitive but new to market.
- Competition – Develop watching brief.
- Performance – 100% accuracy required.

Competition

Understanding the Competition

- Identify key competitors within the markets identified in the new market area.
- Research strengths and weaknesses, considering new markets.
- Branding of competition – strength of brand v cost in marketplace
- Overall brand positioning of competitor

Identify key differences of our brand against competitors.

- Analysing visual branding, messaging, colour, overall style, touch , size.

Identify design trends based on competitors.

Consider our brand relevance against competitors in our target markets.

Understand market trends – purchase of data on market trends.

Monitoring of pricing strategies over a period of time to consider product price.

Look to procure a range of analysis reports on the competition detailing brand attributes, market position, their unique value proposition, and functionality.

Cross References

- Markets – Must drive new customer growth through new market development.
- Product Cost – competitive but new to market, may drive additional profit opportunities.
- Performance – 100% accuracy required.
- Budget – consider budget requirements to purchase data and market position of competitors.

Aesthetics

Colour –

- Selection could be considered as critical for different markets and re-enforce entry into new market.
- Constant with current company branding or consider new market breakthrough.
- Review of colour palettes against cost base

Composition – research Apple and Amazon products for surface touch

Texture Typography – aiming for tactile touch.

Touch – soft touch buttons but require to be firm turning on

Lighting – consider if unit requires lighting if used in certain markets.

Proportion and Scale –

- handheld (palm size)
- Consider male or female use.

Compatible accessories

- Charging Cable
- Breath tubes (based on current disposable tube technology)

Budget and Cost

- Colour and size to be reviewed at each stage to ensure price point reached within profit expectations.
- Consider one standard colour

Cross References

- Branding – Must drive new customer growth through clear branding.
- Product Cost – competitive but new to market.

- Competition – Develop watching brief.
- Product costs – profit considerations against colour and size – modelling to be developed.
- Disposal and recycling – Unit to be reused , disposal of breath tube – link to marketing message
- Budget – consider budget requirements to purchase data and market position of competitors.

Branding

Develop a branding strategy by consideration of the following areas, and directly linked to the customer markets identified:

Target Audience

- Key sectors identified for business-to-business activity; end user will be into public area.
- Consider if military use, would it be non-branded?
- Partners branded opportunities – may be stronger and could reduce cost basis.

Brand Positioning – 100% accuracy and for your well-being and health

Brand Personality – As product promoted as healthy well-being, can a persona be developed for the device

Brand Identity – Overall links to all consumer facing resources, including website.

Brand Experience – social media promotion on health well-being sites, development of social media plan

Competitive forces – joining with partners to promote brand loyalty.

Brand messaging – clear and focused on one message – health and well being

Cross References

- Product Cost – competitive but new to market.
- Competition – Develop watching brief.
- Product costs – profit considerations against colour and size – modelling to be developed.
- Disposal and recycling – Unit to be reused , disposal of breath tube
- Budget – consider budget requirements to purchase data and market position of competitors.
- Customer – clear and defined links to customer base and new areas of market penetration
- Aesthetics – the look and feel will affect the overall brand message.
- Circular Economy – linked brand message to recycling

Company Constraints

Overall, the design brief sets out all areas to be considered however the following require significant consideration by senior leaders as part of the overall strategic review. Report monthly to main board on key risks and actions required.

Budget – Senior level agreement on budget areas, new funding opportunities , discussion with share holders and bank on overall commitment – lead by CFO

Timelines – Clear and focused time to actual market to link into budget considerations.

Brand Guidelines – Link with Head of Marketing to consider against current products, and can it displace competition.

Technical limitations – Develop further link with university or consider technical expertise required to be recruited on short term contracts to resolve technical issues

Legal requirements – CFO to develop external request for additional legal support, to support marketing claims, technical claims and to protect IP.

Manufacturing base V sub contract – Senior lead to consider key elements that could be sub contracted or purchased in, without loss of IP of slippage to project, against current capabilities

Customer – Marketing senior lead to liaise with key customers to develop understanding of market opportunities.

Cross References

All areas of the report require consideration against Company Constraints if there are any areas that directly affect the above areas. This is required as a urgent matter at any point during the process, with the agree right to challenge as a core component in the design brief senior leadership meetings

Manufacturing Facilities

Consideration of current facilities to understand constraints we need to consider:

- New equipment requirements
- Skill level required of existing staff.
- New staff required
- New quality control measures?
- New regulations for build linking into sustainability model.
- Any changes to facility layout without disruption of existing products
- Is a new facility required?
- Measurement of new costs to be undertaken

Cross References

- Product Cost – Depends on manufacturing costs.
- Product costs – profit considerations against new costs for capital or staffing costs

- Budget – consider budget requirements to purchase expertise
- Quality – consider all quality standards and requirements can they be met within facility.

Product Budget Costs

The product budget costs have a direct impact on decisions made during the process, and a clear balance of costs versus desired features is required.

The finance team must conduct a budget review and :

- Define the Budget overall before commitment of resources.
- The whole team must prioritise features against the budget , to ensure key areas of design are considered
- Consideration of actual material costs – The material at present consideration, to include the physical components , cost of manufacturing and sub-contracting
- Focus on value – ensure profit margins agreed can be delivered or increased by understanding budget constraints.
- Flexibility of design v actual budget

Cross References

- Product Cost – competitive but new to market.
- Competition – Develop watching brief.
- Product costs – profit considerations against colour and size – modelling to be developed.
- Disposal and recycling – Unit to be reused, disposal of breath tube or should it be disposable from profit view point
- Customer – clear and defined links to customer base and new areas of market penetration
- External partners – consider if partnership might increase budget in key areas

Quality and Reliability

The unit must consider all Safety Standards and compliance with :

- Electrical safety (LVD)
- Electromagnetic interference (EMC, RED)
- Hazardous materials – disposal of end of life product (ROHS , WEEE)

The unit must have full regularity compliance for each country the device could be sold in . Consideration of external report on all regulations before manufacturing commences.

Reliability standards – consideration of lifespan of the products design , against the market deployment , in relation to temperature and humidity

Performance standards must consider key elements including minimum and maximum operating temperatures , input / output requirements , power consumption , and also link into considering competition claims

Cross References

- Product Cost – competitive but new to market.
- Competition – Develop watching brief on performance standards
- Product costs – profit considerations against colour and size – modelling to be developed.
- Disposal and recycling – Unit to be reused , disposal of breath tube
- Budget – consider budget requirements to ensure standards are met in key global markets
- Customer – clear and defined links to customer base to ensure requirements are met
- Product Lifespan – link to standards for disposal in a safe manor

Circular Economy

The concept we are developing is to consider how to minimise waste and end of life recycling of our products.

We are looking at a design that is rugged and built for durability, that can be used in all environments.

The design needs to consider end of life and can the product be disassembled to easier recycling and re use of product materials.

The disposable mouthpiece must be reviewed to consider if it fits into our move towards a circular economy or are there alternatives

Budget considerations must be considered as a balance of material use against core costs should be considered.

Cross References

- Product Cost – competitive but new to market, but linked to recycling potential
- Competition – Develop watching brief on circular economy claims
- Product costs – profit considerations against colour and size – modelling to be developed.
- Disposal and recycling – Unit to be reused , disposal of breath tube
- Budget – consider budget requirements to ensure standards are met in key global markets
- Customer – clear and defined links to customer base to ensure requirements are met
- Product Lifespan – link to standards for disposal in a safe manor
- Legal – consider legal requirements for disposal
- Packaging – consider total journey of packaging within the circular economy

Disposal and Recycling

An end-of-life plan for management of the device, including reduction of hazardous materials is required, and within that a detailed budget for end of life considerations.

Recycling plan is required to ensure full and proper full disposal of all the equipment that is purchased looking at all international markets.

Consideration of take back model of recycling, to ensure full links back to circular model , and to build in potential budget savings within model.

Develop marketing message based on agreed disposal and recycling plan , to maximise market impact

Cross References

- Product Cost – consideration of recycling plan against product cost base
- Competition – Develop watching brief.
- Disposal and recycling – Unit to be reused , disposal of breath tube
- Budget – consider budget requirements to develop packaging within target market
- Customer – clear and defined links to customer base and new areas of market penetration
- Legal – Consideration of all laws and standards against plans to ensure legalities

Design Standard and Documentation

The device will be built to comply with the following international standards:

- IEC 60950 – Information technology equipment
- IEC 62368 – Medical equipment
- Restriction of Hazardous Substances
- WEEE Directives as determined.

In addition, further consideration will be given to relevant international standards linked to marketing strategic delivery.

A detailed review of all standards will be undertaken to directly link into the recycling plan for the product.

Cross References

- Product Cost – consideration of required standards against product cost base
- Competition – Develop watching brief on use of standards
- Disposal and recycling – consideration of standards
- Budget – consider budget requirements to develop relevant standards within budget
- Customer – clear and defined links to customer base and new areas of market penetration
- Legal – Consideration of all laws and standards against plans to ensure legalities.

Process Control

Process control within the product specification is a key driver to ensure the requirements as set out for the customer and our marketing claims.

A plan is required to set out the key areas to be considered within the overall process control process :

- Identification of critical control points to avoid deviations within the product , including raw material , and final product specification
- Clear process parameters to be set at all stages of production to deliver quality product
- Monitoring and measurement processes to be defined
- Implementation of key ISO processes and TQM techniques to ensure quality is a core driver within the process

Cross References

- Product Cost – consideration of process control costs against product cost base
- Disposal and recycling – consideration throughout process of unit to be reused
- Budget – consider budget requirements to develop clear process controls that deliver right 1st time delivery of product
- Customer – clear and defined links to customer feedback on quality of processes
- Legal – Consideration of all laws and standards against plans to ensure legalities that need to be considered within internal and external process

Continuous Improvement

Development of cyclical process through out product lifestyle to drive continuous improvement.

Work with marketing and sales to get real time feedback from customers to consider critical friends feedback.

Data analysis of key areas on an ongoing basis, to understand patterns of feedback including failures within the process

Implement changes throughout the process based on current and real time feedback.

Cross References

- Consider all areas within the design brief where data and feedback can add value to the understanding of improving the product
- Product Cost – consideration of improvement costs against product cost base and feedback to senior leaders where challenges are identified

- Disposal and recycling – consideration throughout process of unit to be reused
- Budget – consider budget requirements to develop clear process controls that deliver right 1st time delivery of product
- Customer – clear and defined links to customer feedback on quality of processes
- Legal – Consideration of all laws and standards against plans to ensure legalities that need to be considered within internal and external process

External partnerships

The requirement of external partners and the link into additional research capabilities needs understanding and consideration within the design brief to ensure that additional capabilities are considered as required.

The external partnerships need to be developed through legal understanding of areas such as IP and as required non disclosure agreements

All partnerships should be developed in an open manor where they add value to the overall product design brief

Materials

The device will require a full and detailed bill of components which will require detailed linking to procurement of key material or parts:

- Electrochemical sensors – porous material which reacts with a test of airborne substance
- Micro controllers – small scale computer
- Display – LCD type
- Housing – durable metal , light weight with recycling properties
- Power Source – USB standard C type connection , with battery backup
- General components – resisters , capacitors , transistors

All materials should be considered in relation to recycling properties.

All materials need to be considered for cost and performance, and if they should be made / bought in directly

Cross References

- Product Cost – consideration of materials used against product cost base
- Competition – Develop watching brief on materials used.
- Disposal and recycling – Unit to be reused, disposal of breath tube
- Budget – consider budget requirements to develop packaging within target market.
- Customer – clear and defined links to customer base and new areas of market penetration
- Legal – Consideration of all laws and standards against

Packaging

The packaging is required to be leading edge in terms of design and recycling with a considered design that showcases the products design.

Within the design the key requirements are:

- Direct protection against potential hazards of transportation
- The presentation should be to showcase the brand and identity of the new product as a market leader.
- Sustainability, must be the key driver within the design and all materials must reflect that
- Budget costs must be measured against cost effective materials.
- Consideration of any legal requirements against international standards.

Cross References

- Product Cost – consideration of materials used against product cost base
- Competition – Develop watching brief on materials used.
- Disposal and recycling – Unit to be reused, disposal of breath tube
- Budget – consider budget requirements to develop packaging within target market.
- Customer – clear and defined links to customer base and new areas of market penetration
- Legal – Consideration of all laws and standards against

Legislation and Legal requirements

Intellectual Property rights will require to be fully reviewed to ensure we are protected , but also consideration of existing patents , copyrights . Review required of current company areas already covered to consider if we require to apply for new trademarks.

Consideration of all UK and International safety laws and standards that the product may breach.

Consideration of all accessibility requirements for disabled people , and to ensure it does not breach international law

Consideration of all environmental regulations and international law , including waste , pollution and ensure we are building to correct standards

Consideration of all consumer protection laws

Consideration of ethical areas such as modern slavery acts

Statements of compliance to be held with central files and data management , but also with customer instructions leaflet.

Consideration of Knowledge capital as an income stream post design process , and to look at how that may add value to the overall product

Cross References

- Product Cost – competitive but new to market, but linked to legal requirements
- Competition – Develop watching brief on circular economy claims
- Disposal and recycling – Linked to environmental considerations
- Budget – consider budget requirements to ensure standards are met in key global markets
- Customer – clear and defined links to customer base to ensure requirements are met
- Product Lifespan – link to standards for disposal in a safe manor
- Packaging – consider total journey of packaging within the circular economy and environmental laws

Performance

The fundamentals of performance within the design brief must consider the overall performance objectives of the who design brief , and achieving key standards such as accuracy , efficiency and reliability

Quality testing is a key element within the performance brief that can set and test quantitative metrics, that would need to consider and include response rates, energy efficiency, error rates, load rates . This needs to driven by Quantitative measures that can be used to drive performance testing against agreed standards.

Qualitive factors also contribute to delivery of performance looking at the Ergonomics packaging reliability, weight, Size of product and Product Lifespan.

Consideration of the contextual elements is also required to do field testing, including Testing and Calibration and Environment maintenance & repair quantity time scale

Prototyping and testing Environment maintenance & repair quantity time scales ,

Cross References

- Product Cost – competitive but new to market but linked real delivery performance.
- Competition – Develop watching brief on performance claims.
- Disposal and recycling – Linked to environmental considerations.
- Budget – consider budget requirements to ensure standards are met in key global markets.
- Customer – clear and defined links to customer base to ensure requirements are met.

- Product Lifespan – link to standards for lifespan of product
- Packaging – consider total journey of packaging for durability.

Cross Functional team - resources and constraints

A developed functional team plan to consider detailed roles and responsibilities, including research team , production team and operational teams

Developing collaborative working within cross teams , and setup key responsibilities to ensure timely decisions are taken .

Seek clear and timely consensus on all decisions that impact on all areas

Human Resources to develop a staff planning resources document to scope out staffing requirements based on manufacturing requirements

Cross References

- Competition – Develop watching brief on performance claims.
- Disposal and recycling – Linked to environmental considerations.
- Budget – consider budget requirements to ensure standards are met in key global markets.
- Customer – clear and defined links to customer base to ensure requirements are met.
- Product Lifespan – link to standards for lifespan of product
- Packaging – consider total journey of packaging for durability.
- Manufacturing – clear understanding of staffing requirements

Product cost

Consideration of budgetary requirements as set by senior management , developing a range of budget plans to allow some flexibility but linked back to profit ratio.

Setting of specific cost targets , to look at every cost within the process , and to consider costs versus quality

Develop a clear cost bill of materials for each component area , including material costs , manufacturing costs , tooling costs , packaging costs , shipping costs and any incidental costs as they arise.

Develop a clear focus on value engineering so to drive cost out of the product from day one of the design brief .

Ensure that real considerations have been given for design for manufacturability to ensure the cost of volume of manufacturing is real and does not impact on final product costs.

Consider material costs by developing a range of options on materials used to allow consideration in final design .

Develop clear links with suppliers as early as possible to look at cost savings and supply issues to ensure costs do not rise

Establish a system of cost tracking and reporting to all parties involved in the design brief , and consider how design trade offs can effect the overall brief and also product costing .

Cross References

- Product Cost – competitive but new to market.
- Competition – Develop watching brief.
- Product costs – profit considerations against colour and size – modelling to be developed.
- Disposal and recycling – Unit to be reused , disposal of breath tube or should it be disposable from profit view point
- Customer – clear and defined links to customer base and new areas of market penetration
- External partners – consider if partnership might increase budget in key areas

Social & cultural circular economy

The consideration within the design should take into consideration the direct market area the product will be sold in, so looking at cultural factors , including lifestyles and values.

Stakeholder or partner engagement can be developed to address concerns and as it is a health living product, consideration must be given to social media in these areas and its impact

Consideration of product sourcing to ensure there is no concerns in regard to modern slavery or environmental concerns.

Consideration of education within the product to promote healthy living and wellbeing , could aid product sales

Ensure that ethical considerations have been considered at all stages of the design and that all claims can be sustained.

Develop a broad sustainability plan to include community benefits that can re enforce behaviour change.

Cross References

- Product Cost – competitive but new to market, but ethical in costing models
- Competition – Develop watching brief.
- Product costs – profit considerations against cultural markets – modelling to be developed.

- Disposal and recycling – Unit to be reused , disposal of breath tube or should it be disposable from cultural view point
- Customer – clear and defined links to customer base and new areas of market penetration
- External partners – consider if partnership might increase cutral gains in key market areas.

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