

Assignment: Module code ACPA 7006

Management of (NPD) New Product Development

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Synopsis.

The first quarter of the twenty-first century has been witness to an shocking wave of severe infectious diseases, 2003 saw the discovery of a severe acute respiratory syndrome coronavirus outbreak, followed in 2009 a pandemic of swine flu. In 2012 the Middle East announced the discovery of another respiratory syndrome outbreak, followed by Africa announcing to the world in 2013 they were fighting an Ebola virus epidemic resulting 11,310 deaths being reported.

Once more in 2015 the world was shocked by the discovery of the Zika virus disease and in 2019 saw the arrival of the COVID-19 pandemic, which had a devastating impact on lives and livelihoods around the globe resulting in high mortality due to its ability to freely spreading across continents to infect people in multiple countries.

At the same time, the twenty-first century has seen an unprecedented era of globalization with leading and developing economies becoming ever more intertwined, delivering challenges to changing demographics, and demands for technological advancements. This has resulted in airline flights more than doubling since start of century, not only impacting climatic change, but enabling individuals to cross borders seamless and quickly resulting in increased risk of infectious disease outbreaks escalating across society.

A University of Bristol report suggests early warning signals (EWSs) could help in the monitoring of disease outbreaks, such as COVID-19 and other respiratory diseases. Subsequently assisting governments and policy makers improve the accuracy of their decisions and allow timely interventions if needed.

These consistent challenges and recommendations offer a clear opportunity for Lion Laboratories expand their current breathalyzer range to develop and launch a new a product to assist in the fight to detect viral infections. This NPD guide will outline the key considerations in this development process.

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Resource

People:

- Does the company and have a clear vision of what opportunity it is looking to achieve.
- Are there the internal skill sets within the company to build a team to design the concept, produce a BOM bill of materials and manufacture the product.
- Appointment of NPD leader/manager, new innovative products or services are more likely to be successful if they are planned and implemented well (Zirger & Maidique, 1990).
- Team selection, selection plays a key role influencing process performance, as teams with a short history together tend to lack effective patterns of information sharing and working together, and teams with a long tenure together tend to become inward focused and neglect external communication. A team with a working tenure of moderate levels is found to deliver higher project performance (Katz, 1982).
- Does the company have the required individuals to implement changes in the processes to allow for additional work loads.
- Training, will training be required and across what spectrum, (Mechanical, Software, Electrical, Environmental, Health and safety and possible new machinery)
- The need for a training plan and schedule will be required, how will this impact the time scales, also does the company have the internal skills sets to deliver.
- How will additional training impact current performance.
- Should future training be implemented by a third party. ([see supply chain](#))

Internal capacity:

- Do we have free capacity to manufacture the new product.
- How will this impact on current supply performance.
- Does the company have the long term financial capacity to up lift their manufacturing capability
- Has the company the machinery required to manufacture the product.
- Will there be a need for additional operators.
- If capacity is available will, there be a need for different shift patterns, example being nights, 4 on 4 off work rotas and 7 day continuous.
- Automation, could the manufacture of the new product be fully automated with the right machinery, if so will additional training be required.
- Are the current manufacturing footprint big enough to accommodate any additional capacity or machinery.
- Will the current utility (Electricity, Gas) infrastructure be large enough for any additional manufacturing capacity.
- Have we enough commercial / business development resource to exploit the NPD launch.
- Will there be a requirement for additional IT, software, marketing people to service the product was launched.
- Depending of service support required, will there be a need for a new website
- Will the development of a customer service portal be required on the website
- Does the company have the on line technical support staff available. ([See resource](#))

Supply chain:

The term supply chain encompasses both the inbound and outbound flows of materials, as well as the supply of intellectual property and services to the company Ulrich and Ellison (1999).

- Does the company currently have the right supply chain partners to collaborate on this new product.
- Do our current supply chain have the financial capacity to up lift their manufacturing capability
- Who from the company would or could manage the supply chain collaboration process.
- Which components could be designed specifically for the product.
- Who will design and who will produce the product.
- Has the supply chain the spare capacity to accommodate additional manufacturing volumes.
- Has the current supply chain the necessary people and skills to support the NPD.
- Will they be prepared to deliver small prototype volumes for early adopter trials and approvals.
- Are they competitive and open to a transparent pricing model.
- Is there a possibility to use multiple supply chain partners.
- Will supply chain partners be amenable to close multiple collaboration.
- Has any of the current supply chain collaborated together.
- Have they performed and produced any NPD in the past.
- What are the supply chains outlook, are they UK, European or Global in their focus.
- Have any of the supply chain partners been successful in launching a NPD.

Engineering

Design:

Constraints

- Are there any size constraints for the unit, examples being;-
 - a. Ease of handling
 - b. Storage of unit
 - c. Packaging
 - d. Industry requirements
 - e. Size
 - f. Weight
 - g. Availability of components ([see Material / Component requirements](#))
 - h. Customer accepted requirements
 - i. Operation in the case of disability

Aesthetics

- What are human factors and ergonomics of the product.
 - a. Can the unit be operated with 1 hand
 - b. Will any visual display take into account colour blindness
 - c. Does the unit require a (VD) visual display
 - d. If so, how large does the VD visual display need to be
 - e. Will the screen be touch screen enabled
 - f. Should there be a large screen size in the case of impaired vision
 - g. In the case of impaired vision can the product be voice enabled
 - h. How will the unit be turned on and off
 - i. Appearance and finish, should the product have clean lines for hygiene sterilization.
 - j. What colours will be used
 - k. Do we want colours consistent with current branding or not
 - l. Should any button protrude to assist visually impaired
 - m. Should there be a use of braille be used, if so how

- Power Source, how will the unit be powered;-
 - a. Battery
 - b. Mains rechargeable battery
 - c. Mains
 - d. HDMI attachment to enable a power source from additional electrical equipment. I.E computer/laptop
 - e. How will the operator know when the battery needs changing or replacing.
 - f. What period of time will the operator have before product shuts down after receiving notification.
 - g. Can the product be left on constant charge.
 - h. Will it possible to charge the product from an independent portal power bank in an emergency.

Material / Component requirements:

In view of current market conditions, and consumer environmental concerns materials throughout the product should be manufactured with the minimal carbon impact and with the circular economy in mind.

- What materials should be used for the manufacture of the outer cover.
 - a. Rubber
 - b. Plastic
 - c. Composite
- Will the material require FDA or any other approvals
- What materials are freely available
- Are there any viable components be reused from past models ([see Environment & Circular economy](#))
- What shape is the unit (Ease of handling should be taken into consideration).
 - a. Round
 - b. Square
- Battery Technology. In line with environmental and low carbon concerns investigative time should be given to review latest battery technology ([See environmental](#)). In the meantime concerns should be given to the following;-
 - a. Battery life
 - b. Recyclability

- c. Charging times
 - d. Useable life
 - e. Recommended standards
 - f. Quality
 - g. Safety record
 - h. New battery technology ([See environmental](#))
- Visual display, consideration should be given to the following
 - a. What size does the display need to be. (suggest a review on current research data, if available) on ergonomics, aesthetics and visuals on Apple or other leading mobile phone manufacturer)

Software:

Software is the set of instructions, data, or programme, informing the product on how to function. It is required in for this product to enable it to communicate with other devices such as PCs, mobile phones, tablets, and other smart devices.

- Have we currently any software already in use within any other product
- Will there be a need to develop a bespoke software
- Are there currently any standard software available
- Will there be a need for the software to be agnostic
- Which software is the least expensive
- Which software is the best to integrate across multiple platforms
- How will software dates be implemented
- Will there be any licensing cost
- Will the product need a Wi-Fi connection to install any update, or can this be done by 3, 4, or 5G connection
- Will software updates impact data usage or charges if applied using a mobile device
- Can the customer use Bluetooth to connect the for updates

Testing:

Product testing offers a range of options, encompassing build quality and market/customer perception;-

- What are the current test requirements for the market.
- Are there any government or industry specific requirements to testing.
- Does the product require the following:-
 - a. Drop test
 - b. Cycle test
 - c. Software bugging test
 - d. IP test
 - e. Water test, depending on IP standards this make require water splash or submersion tests
 - f. Any customer specific testing requirements
 - g. Electrical testing

- h. Software download test, using hardwire, Wi-Fi and Bluetooth
- i. 3,4 & 5G testing for signal performance
- j. Heat and humidity testing extreme cold & hot
- k. Shock test
- l. Vibration
- m. Corrosion concerns
- n. Transportation and distribution test
- o. Battery leakage
- p. Operational ON/OFF test
- q. Pressure test
- r. Sea and altitude testing for marine and aviation use
- s. Sterilization, product will be required to be clean with alcohol wipes and or solutions.
- t. Early adopter test by potential customer to assess market response

Service support:

Service support will need to delivered for software updates, maintenance and or any mechanical and electronic issues that may arise.

- Will software updates be available on line to enable upgrades and fixes
- Do we require a customer specific on line portal, and does this need to attached to our web-site
- Is there a need instruction manual for the unit, or should it be online
- Should a single page introduction be delivered with the product and produced in the recognized EU countries languages, instructing the customer to login and register their product
- Does the on web support portal need to be multi lingual and differentiated for the customers to navigate by their countries flag
- Do we need an easy guide video on maintenance and service of the product
- Should the video downloadable and be able to viewed across laptops, desk tops, Tablets and mobile phones

Certifications:

Product certification, this is the process by which the product will need to be tested to meet regulatory standards in the market or industry. As the unit under consideration is targeted at the medical / health industry consideration must be given to:-

- The minimum health industry standards
- Any regulated by government standards or requirements
- A clear understanding of the process to attain required standards
- Time scales to achieve the required certification of the product
- What financial costs in attaining both the regulated standards and certification
- Any ongoing licensing cost to retain the certification
- Will there be any future auditing costs to retaining the certification
- ISO/ Environmental certification

Warranty:

- What are the industries expected warranty period
- What is the expected life expectancy of:-
 - a. Software
 - b. Electronics
 - c. The casing and framework
 - d. When do we envisage a future upgrade to initial launch model
 - e. What is the current warranty of any similar models in the market
 - f. How will returns be handled
 - g. Will there be a need to open a new department
 - h. What is the warranty policy (Direct replacement, service exchange or repair and return
 - i. What is the expected time scales on warranty claims
 - j. Will it be possible to calibrate and repair any software issues on line

Packaging;

- How will the product be shipped to the end user ([see logistics](#))
- Should any packaging be obtained using recycled material ([See environmental](#))
- Can all packing be recycled ([See environmental](#))
- Can the product be delivered without the use of any plastic material ([see tax implication](#))
- Will it possible to deliver the product with zero packaging
- What is the possibility of all packaging being returned once delivered
- How much will packaging cost
- Can we charge extra for packaging
- How will the packaging be branded
- Will the packaging be own branded or customer specific
- How many can be shipped on a standard pallet for transportation
- What will most economical box size quantity
- What is our current box size quantity for similar products
- Should all packaging contain printed instructions on how to recycle
- Can all packaging be returned and subsequently reused
- Ensure all packaging is sustainable

Logistics:

- How will the product be shipped
- Who will be the logistic partner
- What are their commitments to the environment & circular economy
- Can this be the responsibility of the supply chain
- What is the most economical shipping process
- How can we ship in a sustainable manner
- Does the customer have their own preferred logistic partner

Environment & Circular economy:

- How can we limit plastic use
- Challenge all supply chain partners to offer more sustainable materials and components
- New battery technology are there any new developments in battery technology which will lessen their impact of the environment and recyclability.
- Can we reuse any components from past models
- Give preference to supply chain partners who embrace this circular economy process
- Ensure an extra-long life on components
- Look at possible second life of the product in developing economies
- Consider possible financial incentive to the customer for the return of faulty or after product upgrade replacement
- All packaging used printed with instructions to recycle
- Environmental Certification
- Is it possible to use only supply chain and logistic partners who commitment environment & circular economy
- Will the NSW parliament legislation to phase out of single-use plastics from June 2022 effect:-
 - a. Repetition of other established economies, such as UK, EU
 - b. Supply for new materials
 - c. Impact on any product using plastics in future NPD development

Financial & Legal

Financial:

- Do we have the boards support and their understanding of the possible time scales involved in the NPD.
- Is there sufficient adequate funding.
- Will there be a need for 3rd party funding.
- If 3rd party funding is required, what form will this take? Government funding will impact speed of the process, whereas VC, high networth investment will generally impact the pressures on commercial return.
- What are the boards expectations on financial costs and time scales from R&D to commercialisation.
- If required does the identified supply chain partners have the financial strength to support this process ([see supply chain](#)).

Budgets:

- Does the board have a budget expectation,
- Is the NPD to be frugal or expansive in its nature.
- Who will be owner and manager of the budget.
- How will the budgets be formed, two suggestions in this approach would be;-
 - a) A top-down approach where consideration is given on previous comparable projects and used as a benchmark or,
 - b) A bottom-up approach where all NPD team members agree the costs they expect to incur with the NPD project manager, who will then estimate the total cost.
- How much is the budget.
- Will there be any contingency.

(IP) Intellectual Property:

- There will be a need to research and understand our current IP (EPO2021)
- NPD team will need to evaluate and provide thorough opinions on patentability, prior to preparing utility, design, or business method patent applications
- Freedom To Operate Stage will also be required and investigations and detailed search reports provided, referencing opinions on whether the product can go to market
- Application for patent and trademark rights
- Investigation will be required to ensure there will be no any infringement on competitors IP
- Who will be responsible for the monitoring of IP infringement
- What will be the action plan for IP infringement

Legal requirements:

- Appointment of a specialist IP solicitor to ensure;-
 - a. The completion of all required contractual paperwork.
 - b. Delivery of IP application.
 - c. No infringements against any existing registered IP
 - d. Support IP & Trademark enforcement.
- There will also be a need for additional legal support for;-
 - a. The development of sales terms and agreements.
 - b. 3rd party supply chain contractual agreements.
 - c. legal obligations in terms of warranty claims.
 - d. Data documentation
 - e. EEC legislation
- Will there be a requirements specialist legal support for dealing with litigation claims for overseas customers

Tax implications:

- HMRC states the manufacture or import of 10 or more tons of plastic packaging within a 12 month period, requires the registration for tax, therefore this needs to be researched and costed
- In case of any consumables, such as the breathing tube could this be manufactured with another more environmentally friendly material
- Are there any other implications of using other composite materials

Sales & Marketing

Customer:

Target current Lion customers as first entry point offering preferential terms and training opportunities to the market, followed by;-

- Board force control
- Government bodies (Schools, Councils, Police, Fire service and any public facing bodies)
- NHS
- Entertainment industry (Theaters, large venues)
- Travel industry (Ferry owners, Airlines, tour operators such as TUI)
- Large corporate organizations who executives travel globally

Location:

- What is the geographical location of the potential customers
 - a. UK focused
 - b. EU
 - c. Global
- How will we overcome the language issues when supporting the product outside the UK
- What will be the cost implications on warranty claims outside the UK ([see Legal](#))
- Will we require local customer service locations in designated countries with strong cultural and language differences

Sales channels:

The Sales channel will be way Lion will take and sell the NPD to the end customer. There are multiple types of sales channels Lion can use, and can be divided into the following, direct or indirect channels.

Direct sales channel:

- Shall we engage directly with the end user
- Will self-service channels such as a E- Shop attached to the company website so the customer can buy and make the payment direct by required
- Do we require an outside sales team to engage with the customer

Indirect Sales Channels:

- Do we appoint authorized stockiest who can sell and service the product
- Should we license the product to a third party company and allow them to white label
- Do we need to collaborate with an established online platform such as Amazon
- Should we partnership and outsource the sales approach to a third party

Marketing:

- How will we market the product
 - a. Social media
 - b. (DEM) Direct E-Mail campaigns
 - c. Through our current customer network
 - d. Exhibitions
 - e. Government networks
 - f. Trade magazines
 - g. New product launch events
 - h. Offer a trade-in against any other Lion product to the same value

Material:

- Should all sales material will be on-line to minimum the carbon footprint
- In case of exhibitions, what product samples, corporate branded material will required
- Do we require a product video guide to explain how to complete registration and how to use instructions.
- Development of technical manuals
- Production of an easy one page how to guide of instructions
- Should there be a production of a braille instruction manual
- How do we assist the visually impaired in product registration ([see aesthetics](#))

Branding:

- Do we need to revisit the company's brand to encompass the NPD
- Will the current brand have any negative impact on the NPD launch
- Would the NPD benefit from separate branding
- How have our competitors approached this issue
- Does the industry have any preference to branding such as :
 - a. Colours
 - b. Visuals, such as infographics

Costing:

- What is the cost expectation of the customer/market
- How do we compare to the competition
- Should we lease or sell the product
- How much profit is expected per unit by the board
- How much profit is expected per unit by the team
- If appointed how much profit is expected per unit by the stockiest
- What is the cost in servicing the product
- Do we need discounting pricing policy
- Should we reduced-cost for increased quantity ordered
- Discount voucher with purchase on other Lion products
- Offer a buy one get one free deal

Competition:

Owlstone Medical, a UK-based company has formed a partnership with pharma company AstraZeneca. The partnership is designed to support the use of Owlstone Medical to use breath to identify biomarkers relevant to asthma and COPD. Billy Boyle co-founder and CEO said that what makes the company's technology unique is that users can program what they're trying to detect just by changing the software. Breath contains about a thousand volatile organic compounds and while most them are simply byproducts of respiration, certain diseases produce metabolites associated with them.



References:

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