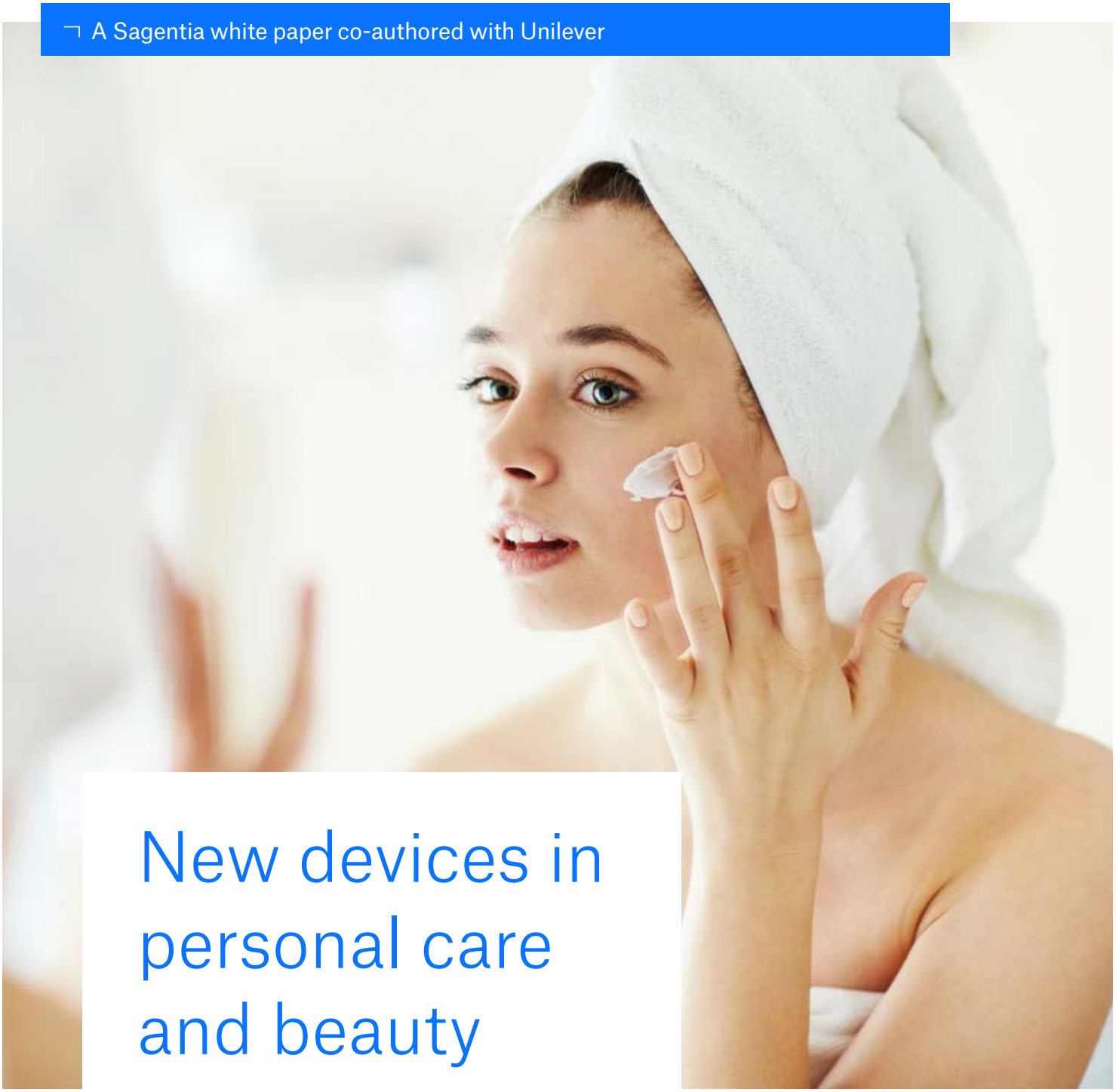
sagentia

a **science group** company

A Sagentia white paper co-authored with Unilever



New devices in personal care and beauty

Contents

The device opportunity	1
The opportunity	1
Why now?	2
Lessons from the past	4
Looking to the future	6
Conclusion	7
Consumer viewpoint	8
Electronics as part of our lives	8
Devices on health	10
Conclusion	10
Technology viewpoint	11
Light – an example platform technology	11
Technology for the masses	11
Device development is different	13
Consumer led	13
Performance vs price	14
Conclusion	14
Diagnostics viewpoint	15
Decision making & personalisation	15
Migration from medical setting to the home	15
Conclusion	17
References	18

The device opportunity

By Dan Edwards, Sagentia

Innovation in the personal care, health and beauty industry has traditionally been dominated by R&D in formulation chemistry and huge marketing budgets. In recent years, however, a new frontier has emerged: the area of devices.

This paper outlines the device opportunity, market drivers and key enablers. This is followed by specialist perspectives on the consumer, technology and diagnostics viewpoints written by experts in each field.

The opportunity

Devices can be used in multiple ways in the Consumer Products Goods (CPG) market, namely diagnostic devices that provide consumers information about their care regime, devices that are used in combination with a chemistry to deliver therapeutic benefit, and standalone therapeutic devices. This has all been done in the past but what is different now is that devices are looking like the next key innovation platform to help take the CPG market forward. The current drive for devices is fuelled by consumer appetite for 'something more' and a string of technology advancements offering exciting yet affordable functionality.

The trend is evidenced by a number of global CPG companies starting programmes to evaluate how to successfully integrate technology-enabled devices and diagnostics into existing chemistry based brands. The aim is to create differentiation in the market and provide consumers with new levels of efficacy and experience by addressing their unique physiology and providing multi-sensorial experiences. Unilever, P&G (referred to in a 2005 Bloomberg report as Proctor &

Gadget), Reckitt Benckiser, L'Oréal, Avon and J&J have all in the last five years launched devices or made announcements about partnering with device technology firms. This builds on the successes of early beauty devices such as pulsed light depilatory aids and electric toothbrushes, amongst others.

In a recent interview, Kline's Karen Doskow (Industry Manager, Consumer Products) said results from their recent report found that the US beauty device category (focused currently on a variety of skin care treatments) is estimated to have grown by about 50% in 2010[1]. An interesting fact the Kline report calls out is that the devices proposition is marketed to and appeals to a broad demographic from acne treatments for 20-somethings, to skin blemish treatments for 30 & 40-somethings, to anti-ageing treatments for 50-somethings. The report also cites the significant role technology has to play in delivering real benefits and a rain down of technology from professional settings to the home.

Although we are focused on offerings relevant to the CPG market in this paper, we can take measure of the market potential for devices in personal care and beauty from the growth in consumer medical devices.

According to a Gartner[2] report , recent advancements in semiconductor technologies have resulted in modern healthcare devices (eg blood glucose meters, cholesterol meters, blood pressure meters and exercise monitors etc) becoming more accessible and affordable for consumers. As a result of changes in government regulation and consumer adoption shifts, these products are expected to grow significantly over the next few years, becoming the fastest growing segment of the medical equipment market and reaching just over $1.8 billion in total revenue by 2014.

Importantly, within the CPG world, device technology is not restricted to just one area of the market; it is likely that innovations will be used across the board. The current front runners are undoubtedly skincare and haircare; but oral health, sexual health, homecare and diet (beauty from within) can be added to the opportunity mix too.

The value proposition for devices in the CPG world

The proposition for a CPG company can be summarised thus:

- Leverage on consumables driving core product revenues
- Brand differentiation
- New innovation platform
- Greater consumer mindshare
- New revenue streams
- Deeper intimacy with customers to capture, test, mine and connect based on data gathered (in the case of diagnostics)
- Enables science-efficacy messaging to be refreshed and extended

For the consumer, the benefits are equally compelling:

- A high level of efficacy can be achieved
- The consumer is placed in an active position of control
- Personalisation – 'focused on my needs, tailoring my experience'
- New formats of sensory experience

Why now?

Reaching the limits of the efficacy message

The global personal care, health and beauty industry spends tens of billions of dollars every year on marketing campaigns to promote new and existing products. For CPG companies the great majority of these campaigns are based on, and seek to highlight, the positive link between formulation chemistry and efficacy; put simply, the better the science inside the bottle, the better the product. Each additional science-based message seeks to refresh and qualify the power of existing brands and launch new ones, often going as far as to incorporate science into the name of the brand itself. 'Skin electro-stimulation technology', 'advanced protection with photostability', 'scientifically proven wetness protection' and 'DNAge cell renewal' are just a few of the hundreds of science-based claims that vie for our attention each day on the supermarket and pharmacy shelf.

While there's no doubt that the science-efficacy message has helped create differentiated and highly durable brands, it is also generally accepted that, as a message, it cannot be sustained forever. Global CPG companies accept that the formulation chemistry battleground has become tired and is suffering from innovation exhaustion. Consumers, too, are becoming sceptical.

Interestingly, the same is happening in the food and drink arena. Companies are increasingly constrained

by the claims they can make both in terms of consumer fatigue but also now due to increased regulatory/ claims committee oversight. In order to make health-based claims, companies are being asked to get special therapeutic classification and in some cases substantiate the claims through clinical trials. Clever marketing to get around this can only go so far. Nestlé is notable for having crossed this FDA-bridge some time ago and now sells food with medical claims. Nestlé did this in part because it has a speciality medical-foods business which develops products for patients with specific disease compromises, but also because it has long held a tradition of highbrow R&D where most food and drink companies have chosen not to. This is an area that other CPG companies will now also have to more closely consider.

Consumer demand

Whilst concerns over innovation fatigue are helping to fuel this new found interest, significant societal changes in the West are an even more compelling market driver.

In the United States, there are an estimated seven million baby boomers turning 65 in 2011. The post war generation is more affluent than that of its parents, has a much greater interest in health and is, for the most part, technologically adept. Baby boomers, and their children, are natural adopters of device innovation. People want to own their wellness. They want to adopt healthier lifestyles and avoid the costly and painful healthcare experiences of the current elderly generation. This means not only greater focus on wellbeing but also better general awareness.

Through the internet, consumers openly discuss and research new products prior to purchase and rate and review them following purchase. In addition, the convergence and overlap of consumer and medical industries is opening up a new opportunity for personal care, health and beauty products. Part of this convergence is being driven by the above mentioned trend for consumers to 'own' their personal wellness and the other part is a systematic effort to cut hospital and healthcare costs. As a result of this, health and wellness are shifting away from professional settings and will become increasingly remotely managed. This will shift the need towards products and devices that individuals can use at home, enabling them to not only recover comfortably but to also self-diagnose and self-treat for some health ailments. For CPG and medical technology companies alike, this is a new market opportunity that will need to be understood and captured.

Technology push

Technology has in the past been seen as male dominated, expensive and clunky. But this is changing. From a consumer perspective, technology is no longer the preserve of the nerds and geeks and recent advancements are making it affordable and accessible. The below are some of the key changes that are causing or resulting from this shift:

- Women now use technology almost as much as men. So, whereas technology has traditionally been a men's only market, women are now an equally important market segment for technology products. A strong indicator of this is that women use social media more than men and are also becoming heavy users of online gaming. According to a recent report[3], female gamers over 55 spend the most time online gaming of any demographic by far and are nearly as common as the most represented group, males aged 15 to 24.
- Across consumer markets, smartphones have changed the image of technology; carrying around an electronic device and having it intimately connected to your daily activities is now very much accepted. From an acceptance perspective this opens up a whole new area for CPG companies where using a home device to dye your hair, remove cellulite or virtually try on clothes no longer seems far-fetched.
- In parallel, new, exciting science and technology advancements have resulted in cheaper, smaller and more impressive 'gadgets' that you can integrate into a product easily. No longer does the technology have to be the dominant aspect of a product from a look and feel perspective. You can have light, lasers, energy sources, magnetics, vision systems, thermal devices etc discretely embedded into a consumer product; delivering a capability without dominating the look, feel and user experience.

The above are just a few changes within the world of technology that are driving the adoption of devices in CPG. In summary, technology now exists to entice customers and to support CPG product claims by providing greater efficacy and faster delivery. It can

deliver experiences along many different trajectories opening a really exciting door to consumer feedback and interaction.

¬ Lessons from the past

The incorporation of technology into personal care devices is not new: self-diagnosis pregnancy tests have been on the market since the 70s. The electric toothbrush, launched a decade earlier in the 60s, is a classic example of how a device and consumable can be combined to create an entirely new opportunity within an existing market. However, until now, there have been relatively few success stories, particularly in the area of device-formulation combinations. Despite the timing looking right, the challenges to successfully develop, integrate and introduce device-chemistry combination products to the market are real. We see an opportunity within the CPG industry to heed lessons from the past and in particular be more articulate in the definition of opportunities.

Devices are different – what to remember...

To succeed this time around, CPG companies will need to plan ahead and learn from previous mistakes:

1. You can't speed through gaining consumer insights and the hugely important discipline of human factors research. Some previous failures can be attributed to these being rushed through and/or misunderstood. Device development projects will require more iterations of Voice of the Customer research because now you are going beyond packaging. It is important to remember this also when introducing a product into a totally new consumer market. You need to do extensive use case analysis and evaluate user preferences for each individual consumer group. An obvious example is that the Gillette men's razor is unlikely to have succeeded with women if it were exactly the same but pink in colour.

2. Device innovation projects (as with all types of new initiative projects) should not be evaluated at the tactical level, but within the larger strategic context. Where this fits in the company strategy is key so that the appropriate acceptance and credibility is gained across the organisation. This is particularly important within organisations or business divisions that have previously been geared predominantly to formulation chemistry innovation.

3. Commercial considerations for device-chemistry combination products are different. It is essentialthat the commercial objectives for the device are defined very early on (eg point of sale marketing device, mechanism to enhance delivery and increased price category, new product line etc.). This will clarify investment decisions around development and unit cost boundary conditions.

4. CPG companies do not always have the necessary in-house device innovation capabilities, organisational structure or established external partnerships to fill the in-house voids. A resource plan and a realistic gap analysis should form part of early planning.

5. CPG companies will also need to consider the potentially growing focus of regulatory and approvals bodies in the personal care and wellness space. The more 'medical like' a product becomes, the greater the scrutiny from the FDA and others. The FDA makes no secret of the fact that it is keeping a watchful eye on CPG companies that are pushing the efficacy limits of traditional personal care products. Combining devices into this mix will require clear communication with the FDA to ensure that any potential licensing hurdles are understood early on.

Vision of a ‘device-formulation’ bundle...

Sarah wanders into the bathroom and places her tub of skin cream on the shelf, next to her a photo of an overseas holiday – she feels smug about her newest purchase. The cream arrived in the mail that morning and has Asian language on it alongside the English. The cream apparently comes from Japan – sourced from a market where the particular skin condition Sarah has (some mild hyper-pigmentation) is more common and addressed with specific branded products.

Sarah didn’t know someone made a cream for her – she’d just gone with ‘dry skin’ face creams from her favourite brand for years. She didn’t really fit into the other ‘normal’ or ‘oily’ categories and her t-zone days were over. She had recently started trying other brands to see if they had something new that would work better but hadn’t found anything special yet. This last time though, her short consultation with an in-store dermatologist and the follow up on-line had actually felt rewarding. It seemed like finally it was more than just marketing hype...

Whilst out shopping a fortnight ago, Sarah saw a promotion by her familiar skin cream brand in-store for a ‘real skin survey’ in which the dermatologist used a fascinating device to diagnose several themes of her skin physiology. At first she was sceptical. But she went along with it and also answered a few questions about her feelings about her skin. It seemed like real science; the device showed them both repeatable results and it was reassuring to know that someone was able to tune into her personal needs rather than putting her into a big group like ‘dry skin’ that missed the point of her hyper-pigmentation.

She came away from the in-store visit with a website tag and user ID which she logged onto via her phone. There was an elegant app that directly linked to her personal skin profile and identified some specialty creams she could try (with reviews), some in-country spas and a short, simple care regime for her skin. All from her favourite brand. It was starting to feel a little more personal, a little cleverer, a little more focused.

She’ll try the cream tonight, after her bath, per instruction. And will certainly be showing her friends the phone app tomorrow at work. Japanese skin – who knew?

¬ Looking to the future

Here is a simple set of steps that get us from ambition and takes us to a position where we are ready to begin product development:

1 Category

Confirm the category, and perhaps the brand requiring device innovation.

2 Business goals and boundary conditions

Articulate the business mandate (the role) of the device (revenue, loyalty, customer activation, brand differentiation etc) and any explicit 'must have' and 'must not have' themes arising (business, market and technical).

3 Consumer needs

Review the available (likely pre-existing) consumer research across the category and distil and select the needs to be addressed (if the research falls short, you may need to conduct some to fill gaps). Translate needs into a small set of experiences and functionalities to be delivered.

4 Concept and technology ideation

Reacting to the request for experiences and functionalities, we can indulge a combined team of designers and technologists in an exploration of both concepts and viable technologies. One might conduct a fast 'landscaping' to highlight existing candidate technologies – this should be conducted within category, but more importantly in adjacent industries (the medical world for example).

5 Concept visioning

Having selected best concepts, quickly generate story boards and a simple visual and descriptive exploration of the new product concept for review with consumers. Based on their feedback we know whether we have a strong proposition to develop. One or two winning concepts are then presented as an investment proposition where development timescales and costs are evaluated against the brand opportunity.

This set of activities need not take longer than 3 months.

CASE STUDY

Dove Advanced Diagnostic Instrument

Why DADI? ¬

The device was conceived to deliver an experience that will support brand activation in store / in salon – to encourage a consumer to trial a Dove product.

Diagnostics are known to drive consumer buy-in and for Dove, whose brand essence is built on efficacy, an empirical statement on hair damage carries a strong and relevant message.

What is DADI? ¬

The device uses hair-on-hair friction as a measure of hair surface damage.

In use, a stylist, or hostess operating at an in store promotion, runs a strand of the consumer's hair through the device. The device gives an instant reading on the level of dryness/damage. The hostess uses the damage score as a cue to advise on a care and product regime.

Finally, the device connects to the internet and uploads the consumer's damage scores along with various meta data (hair colour, user profile). This provides the foundation for a consumer service platform (mobile phone) and an R&D research platform.

¬ Conclusion

The market is signalling its readiness for devices in personal care and beauty. We observe significant growth rates (US reporting ~50% in 2010[4]) and we have a good explanation as to why it's happening now.

New devices – both diagnostics and therapeutics – will be developed and launched over the next five years across the skin, hair, oral care, sexual health and beyond personal care in, for example, food and drink categories.

It is certain that new brands will enter the space; this is in no small part a result of the huge challenge traditional CPG businesses face in managing the development, launch and in-market support of devices. Nevertheless, the opportunity is there for the taking should traditional CPG companies find managerial and business model vehicles through which to execute it.

In closing, here is a summary of key take-aways for executives considering devices in personal care and beauty:

- Review the opportunity for a product bundle that places devices and possibly services alongside your consumables and decide if you have the stomach to manage the implied business models for devices (and services);
- Be clear on the business value and hence investment criteria for devices within your brand portfolio;
- Focus on consumers' aspirations for efficacy and experience to guide selection and definition of device concepts. These are the values devices drive;
- Exploit the full potential of devices in a product bundle with services included;
- Prepare a technology strategy that considers both re-badging existing technology (developed by others) and development of proprietary technology, and be guided by an assessment of the competitive agenda (the need for differentiation or not) and willingness of your company to manage a product development who's timescale may exceed the typical tenure of your brand managers (18 months);
- Any technology must submit to the designer's instinct and skill in definition of experiences that delight. If the technology is best rendered invisible… so be it;
- The medical industry is a deep source of inspirational diagnostic and therapeutic modalities to be tamed for a consumer application;
- You can expect new rain-down technologies to spend at least a product generation in an intermediary channel such as a spa or in-store promotion before making the leap from professional setting to the consumer's home.

The rest of this paper offers three distinct discussions around this opportunity – from the consumer, technology and diagnostics viewpoints.

Consumer viewpoint

By Unilever R&D contributors:

Holly Whelan, Ph.D.
Global New Business Director,
New Business Unit

John Bartolone
Global R&D Director, Unilever

Gail Martino, Ph.D.
Manager, Emerging and Disruptive Innovation,
Unilever R&D

Srinivasan Krishnan Ph.D.
Manager - Emerging & Disruptive Innovation,
Unilever

Balancing the competing demands of home and work is an all too familiar dilemma for most of us. Similarly, there's often a balance that needs to be struck between standard of living (striving for income) and quality of life. For generations the focus has been primarily on improved living standards but the balance is beginning to shift. While there's no doubt that we'll continue to strive for a good standard of living in the West, there is growing evidence to suggest that for many of us quality of life is just as important, if not more so.

Quality of life and wellness go hand in hand and for many, especially the elderly, they are almost interchangeable. While the close relationship between the two is a given, it is only now that society is adopting a more pro-active approach and a more considered and informed view about how health and wellness can be improved. As health 'consumers', we are less willing to be passive and accepting; increasingly we want to both 'own' and control our health.

Technology, in the form of diagnostic products and delivery devices, has a key role to play in this new, health-aware world. We have seen consumer electronics (mobile telephony, mp3 players, computer games and gps trackers) become widespread, more intuitive and easier to use. With a few notable exceptions, consumer health, wellness and beauty technology has arrived late to the party. It's having to play catch up.

Electronics as part of our lives

The convergence of technology platforms, the growth of smartphone apps, advances in diagnostics technology and the migration of professional healthcare products into the home will all contribute to the rapid take up of technology in consumer markets. Women, who have long been portrayed as technophobic, will drive market growth in wellness devices. There are now almost more women gamers and smartphone users than men worldwide[5]. Women may approach technology in a different way to men, but they are no less adept at using it if the benefits are meaningful to them.

We're different

There has been much research and speculation about what drives this new found desire to improve the health and the quality of our lives. Certainly, there's an emotional element: as children, many of us would have watched 'space age' TV shows and cartoons that will have helped shape a vision of a technology-enabled future.

Iconic role models have also played a part. The American 'Godfather of fitness' and motivational speaker Jack LaLanne spent the best part of his 97 years promoting a lifestyle based around a healthy diet and exercise.

International star Jane Fonda launched her first workout videos in 1982. With more than 17 million copies sold, the video can justly claim to have kick started the mass market appeal of regular exercise in the United States, especially among women. She has gone on to produce more than 20 exercise videos, the most recent in 2010 at the still youthful age of 72.

Aspirational lifestyles and role models have helped influence the outlook and expectations of the baby boomer generation. At the start of 2011 there were seven million boomers turning 65 in the US alone. This group has seen parents and older relatives struggle with health issues and healthcare costs. They don't want to follow the same path and are taking active steps to avoid it. This generation might not particularly have grown up with consumer technology, but it recognises the benefits and is young and enthusiastic enough to embrace it.

The following generation – Generation X – despite being portrayed by market researchers as having a more questioning and sometimes cynical attitude towards authority and big business, has readily taken to technology (perhaps a form of self-empowerment). They are the first to have been exposed to it at an impressionable age. Generation Y meantime, today's youthful consumers, have grown up with technology. The attitude of this Facebook generation to technology is different again because it has never known a time without it. Generation Y will be the first to see health and wellness based technology seamlessly integrated into their lifestyles. The next question is, what will Generation Z know and expect?

Increasing costs and distrust of healthcare system

There are attitudinal differences to healthcare provision too. The boomer generation, by and large, still places a good deal of trust in healthcare professionals. The availability of internet coupled with a greater interest than their parents in health matters has, however, led this group to research and supplement the advice and diagnoses provided by health practitioners.

In contrast, Generation X has a greater tendency to outright question the professional view and is less trusting. A generation ago, patients felt short changed if they left the surgery without a prescription. Although this view still persists, Generation X, especially, is suspicious of the doctor who reaches for the prescription pad too readily. There also remains tremendous time pressure on doctors who may have as little as 10 minutes allotted to them for each patient consultation. This is enhanced by significant cost cutting measures across most Western healthcare systems, which all aim to streamline patient pathways, making them as economical as possible. The tendency is therefore for doctors to treat patients generically versus spending the time to confirm that each patient won't represent an outlier with unique symptoms or conditions.

Focus on lifestyle changes

Governments across the developed world are under huge pressure to address the spiralling cost of healthcare provision. Despite the best intentions of an increasing number of health conscious consumers, it sadly remains the case that 40 per cent of major diseases can be tackled through diet and lifestyle. The threats posed by alcohol and tobacco are well documented with strong government and consumer action being taken in the case of the latter.

But in other health areas linked to 'lifestyle', incident rates continue to rise. In pre-war Germany for instance, Type 2 diabetes was largely unheard of. Today, a significant percentage of the population has been diagnosed with it. With prevalence rates doubling between 1990 and 2005 in the US, The Centers for Disease Prevention and Control (CDC) has characterised the increase in Type 2 diabetes as an epidemic. The evidence for this startling rise points to obesity and lack of regular exercise.

The cost of healthcare provision, and the strategies that governments will devise to tackle it, will be one of the defining issues of the early 21st century. Diabetes as an example is a disproportionately expensive disease, which according to industry reports[6] can increase the per-capita cost of healthcare five-fold. Companies operating in the food and drink sector are well placed to help tackle those costs through high profile diet and lifestyle campaigns. These campaigns needn't stand alone. We're likely to see a great many partnered initiatives in the future where consumer companies, charities, sports bodies and government health departments join forces to promote powerful 'healthy' lifestyle messages.

More information

The availability of information has been a central feature of the rise in consumer interest in wellness. We are being encouraged to 'own' and know our bodies, be more aware of the signs when something is wrong and be more active in establishing what the causes may be. If a consumer is able to monitor their health (perhaps in the course of striving for a health goal), this

information (feedback on progress) drives compliance with the regime. In other words, the monitoring itself has a positive impact on the outcome.

Smart 'googling' and participation in health user forums and chat rooms offer alternative sources of information and/or the opportunity to share experiences and concerns. The boomer generation has learned how to access these new information sources. For Generation Y, the internet is no more challenging than the telephone was to their grandparents. They naturally default to it when they need information or want to share it. And remember, we should be thinking in terms of a mobile internet platform, not a PC.

With the sheer volume of information now available on the internet and the positive health and wellness claims promoted by CPG companies, it comes as no surprise that many consumers are confused about the competing claims of one product over another. While many consumers are happy to go along with on-pack information, others are learning how to decode the claims and data they are confronted with, rather than take it at face value.

Devices on health

The full scale acceptance of consumer technology in other areas of our lives bodes well for CPG and device companies as they plan their future health device strategies. Products will be launched to users who are already highly confident around technology and who will cast a discerning, critical eye over a new product's features, functions and benefits.

At the very least, devices will need to be easy to use, intuitive and self-reporting. Consumers will want far more than simple data and diagnosis. They will want to know what to do next, what product to use, and how their condition has changed/improved over time. They also want more than just marketing 'hype'. Human nature dictates that they will want near-instantaneous results and they will want to see rapid changes. Ensuring that consumers stay with a course of treatment when confronted with only small incremental changes will be a major challenge for the device manufacturer.

Personal use products will need to integrate into existing lifestyles, be discreet and very possibly built into, or designed to work alongside, smartphones. Bearing in mind the rapid rise in free or near-free smartphone apps, the product will also need to demonstrate clear added value and differentiation to be commercially viable.

Manufacturers also need to be mindful that product usage will vary widely. Some devices will be designed to provide a highly personalised product experience whereas other high cost units will be bought collaboratively and shared among several users.

Conclusion

The development and introduction of digital consumer technologies over the past 20 years has dramatically changed how we live much of our lives. However, in the areas of personal care, health, beauty and wellness, technology has barely scratched the surface of possible opportunities; it has yet to show what it is really capable of.

Technology savvy consumers, from baby boomers to generation Y, want to live healthier, longer lives and expect help in doing so. Technology is set to help them achieve that goal. Over the next 10 years we will see a marked and sustained growth of this area.

There will be pressure on innovators to go beyond consumers' current technology expectations. Users have already bought into technology, they are no longer dazzled by it. What will impress are products that deliver real, measurable changes in wellbeing, are easy and enjoyable to use and can show that cost, whatever that may be, is more than justified by outcome.

Technology viewpoint

By Alun James, Sagentia

Light – an example platform technology

Let me start with an example technology – light. Light is a fantastic platform technology as it has application in a wide variety of consumer needs and physiologies. Today, for example, there exist light-driven devices that aid acne, psoriasis, skin rejuvenation, hair removal, sleep, tanning, cleaning and mood. On the medical side, we see take-home light enabled devices that tackle wound healing, pain and even alleviate the symptoms of Parkinson's and Alzheimer's. Light is a friendly, effective form of energy that the body responds well to.

These applications and devices are well established, but there are more opportunities looming. This expectation of growth is based on consumer demand for physiology intervention (see previous discussions on consumer demand for efficacy and wellness) and importantly a price commoditization of key technologies.

High brightness LEDs (light emitting diodes) and even laser technologies are now affordable for instantiation within a consumer-sold device (High power LEDs cost around £0.50, lower power LED indicators are a few pennies). Consumers want to believe in the efficacy of these devices, and will find disposable income for them. Health and beauty devices are in some cases a luxury purchase, but consumers today will rationalize the purchase if they believe in the outcome. These LEDs are significant technologies (over a common incandescent light/heat source) in that their wavelength is specific (narrow range) and selectable. This is key for tuning into certain physiologies, or certain chemistries that we might want to activate in the case of a device-lotion effect. Defined wavelengths also allow multi-spectral imaging for contrast and visualisation enhancement. Lasers take the LED advantages to another level by the ability to focus and target the effect only where it is needed.

Technology for the masses

Long gone are the days when technology was the preserve of geeks and early adopters. The general public has welcomed technology innovation with open arms: smart phones, ipods, xboxes, e-readers, notebooks and sat navs enrich our lives. They entertain, de-stress and inform us. They are intuitive and we feel confident using them.

While device technology has lain at the heart of the boom in consumer IT, telecoms and gaming, it has had relatively little impact in many personal care, health and beauty markets. Until now that is.

It would be easy to assume that companies operating in this market are spoilt for choice when it comes to technology. There are a plethora of platforms available to them (see examples in Figure 1). IT and telecoms technology will play a major role but there are a great many other candidates, in particular the medical industry has a lot to offer. Light based therapeutics built around UV and IR are moving out of the clinic and into the retail arena. Lasers, ultrasound, biometrics, vision systems and electrophoresis, to name just a few, are some other contenders.

Figure 1: Some exciting technologies

(UV) light (eg for tanning and cleaning/sterilising	Composite materials
Infrared (IR) light (eg for skin penetration, heating, photodynamic therapies)	Signal and data processors
Lasers	Motors
Laser diodes	Photovoltaics (solar cells)
LEDs	Fuel cells
Vision systems (combination of low cost cameras and processors as evidenced in mobile phones	Battery technologies (primary, rechargeable, lithium ion, paper)
Multi-spectral imaging	Flexible and stretchable electronics
Thermal treatments (hot and cold)	Moisture sensors
Electro stimulation	Temperature sensors
Biometrics	Virtual reality
Ultrasonics (imaging, cleaning, massaging, heating, stimulating)	Electromagnetic sensors
Accelerometers	Capacitive sensors
Tilt sensors	Stress and pressure sensors
Plasma	Strain sensors
Electrophoresis	Magnetic sensors
Tagging (sophistication ranging from RFID to simple mechanical interlocks)	Display technologies (e-inks, LCD, LED, oLED)
Wireless communications (radio: eg wifi, Bluetooth, zigbee, GSM, GPRS)	Printable electronics
Real time location services	Terahertz
Global positioning systems (GPS)	Electronic noses
Optoelectronics	Chemical detectors
Shape memory alloys	

Device development is different

On the face of it, the vast array of technology (as seen in Figure 1) would appear to be a good thing. But for CPG companies and their technology development partners, choosing the right technology can be challenging due to the balance that needs to be struck between the requirements of price, performance, business model and regulation.

In addition, the development dynamic that characterizes device innovation and formulation chemistry innovation is also very different. CPG marketers are used to visiting with their R&D colleagues periodically and asking 'what have you got for me'. At which time R&D will present some of the recently prepared formulations. From this point until market launch of that chemistry, the R&D process runs a familiar, relatively short timeline measured in months, mostly concerned with operations, regulatory checks, supply chain confirmation and a host of marketing activity.

If a brand sees potential in a device, there are two options – re-badge an existing product (often sourced from the Eastern markets these days) or develop a new product. Re-badging is popular as it is relatively fast (assuming contractual agreements can be streamlined) and low risk. The downside is that the technology is rarely differentiated, nor does it come with exclusive IP. There is a real possibility of launching a device concept that will be copied if successful.

Device development on the other hand holds the promise of unique, protectable differentiation, but comes with a burden of development timescales that are less familiar. A simple concept (two or three mouldings, the simplest of electronics) can be moved from paper concept to production in five months. A complex device (electro-mechanical, intelligent sensing) may take 16 months to move from paper concept through technology demonstration, system design, aesthetic design, detail engineering, prototyping and testing to manufacture scale up. Bearing in mind that the average tenure of a CPG brand manager is 18-24 months, the longer timeline associated with device development presents an institutional challenge to be managed.

Consumer led

As product developers, we need to remind ourselves of the question 'what am I trying to achieve?'. In some markets technology push (ie 'I've just created this wonderful new technology, now what can I use it for') is valid, but less so in personal care. Here our focus should be driven by market need: 'I need to measure skin pigmentation, what technologies are there that can do this within defined and price, performance and usability parameters'. More often than not, the role of technology in this environment will be as a (hidden) enabler, not as an overt, visible presence. We are not delivering 'cool technology' we are delivering 'meaningful brand experiences.' We should be enhancing the user experience and providing some 'feel good'.

I believe the development of successful new devices in this area will result from development teams that understand, appreciate and exploit the interplay between human factors, design and science & technology. It is important that there are individuals who can interface and 'mediate' between the two, often mutually misunderstood, disciplines of social sciences and physical sciences. Technical knowledge layered on consumer insight is a rare but important skill in the development of successful devices in this space.

End user compliance is important: if the consumer does not detect an almost immediate improvement or change in his or her condition following treatment, there is less likelihood of treatment continuing and thus delivering real change. Often, the physiology changes we are delivering are too subtle or too small to detect without external help, i.e. technology. We might even consider designing a brand experience that delivers a real, long term gentle (slow) improvement in physiology that is measured by a device alongside the gratification of an 'immediate improvement' that is likely cosmetic rather than fundamental.

As discussed, this use of technology to facilitate end user compliance is important, and it is too easy for the technology to generate lots of data, but no value to the user. The translation of the data into useful information, and the presentation of that information in a meaningful manner to the user is crucial. I'd argue that if the device does not reinforce the user's belief that the product is beneficial, then the device is worthless.

¬ Performance vs price

Performance (including durability and reliability) are also key considerations during the early stages of the design process. Over engineering these features will raise the cost of the unit and increase development time which may be unwise from a competitive position – particularly if the device is likely to be discarded and replaced in a couple of years. Is the device designed for consumer or professional use? Will it be used in the home, in a clinic or in-store? These questions are important, as they drive cost, design, business model and technology. A medical device can afford to pick and customize the 'best' technology, whereas a consumer product may well need to launch in a matter of months to tie with seasonal retail calendar or to support a pre-determined brand refresh.

¬ Conclusion

Technology is set to make a major contribution to CPG revenue streams over the coming years. It's no longer a question of if but rather more a question of where and how. In stark contrast to many other markets, where new innovations are often praised, personal care technology will most often remain transparent or hidden. This is as it should be. Niche (male) markets aside, most users of personal care diagnostics and delivery devices will primarily be interested in measurable benefits in their wellness and the feel good sensory experience. Technology has a pivotal role to play in achieving this, but it needn't be centre stage in this market.

Diagnostics viewpoint

By Sue Watson, Sagentia

Decision making & personalisation

Most of us would agree that consumer choice is a good thing. However, a significant problem with the health and beauty market in particular is the sheer volume of products; we've all had moments of confusion in the supermarket about which product is best, be it toothpaste or shampoo. For skin care the problem is amplified; products cover a range of conditions and a wealth of potentially confusing claims are made.

How do we know that skin cream x with its bold scientific claims is actually reducing a pigmented spot at a molecular level before it's visible at the macro level? Is the day cream really helping to increase the moisture content of our skin? Providing the consumer with feedback that helps answer these questions will inspire confidence and increase brand loyalty.

Diagnostic technology has the potential to personalise the consumer industry by radically increasing the engagement with the consumer. It allows the user to take greater ownership of their personal health and appearance through devices which can select care regimes, direct care regimes and monitor results.

Diagnostics to feedback and eventually... services

One key difficulty with diagnostic and monitoring devices lies with how to deliver the information in a format that is appropriate to the consumer. It's not enough to say 'here's the problem', in fact the actual 'diagnostic' result is almost irrelevant, it needs to be translated into an actionable response, eg 'use this', 'apply this here', 're-test in 48 hours', 'keep going, you are improving'. The consumer takes charge but in a highly controlled and directed manner.

For the consumer, irrespective of end use and technology employed, the device must be externally simple, intuitive and have clear messaging. Internally the devices may well be highly sophisticated and will often need to carry out complex analysis in order to give a clear output. But what matters is the output – a simple instruction on 'what next'.

The feedback instruction from a device must be action oriented in that it should not leave the consumer with either interpretation to carry out, or confusion over how to do the right thing. Feedback can (and should) reinforce a positive behavioural regime which might extend beyond the appropriate use (or compliance as the drug industry calls it) with a given branded product into activities such as diet, exercise and so on. And herein lies the key to enabling a service platform. If you can tell a consumer something about themselves, this is a legitimate start to a dialogue. Consumers will invest time communicating with a brand if that brand gives something of value back through the course of that dialogue. That dialogue is the service.

Migration from medical setting to the home

It is our belief that high value diagnostic and monitoring technologies will migrate from medical settings to the home and will do so via an intermediate setting. This intermediate setting may be a spa, a hair salon or an in-store promotion environment. This intermediary setting acts as a staging ground in two respects. Firstly it presents opportunity for the technology to become known to and accepted by the consumer. Secondly it allows the technology to mature – to reduce in price and become less complex in use and hence fit for use by an unskilled user.

Pregnancy testing is a good example of a science (lateral flow strip) that has been rendered into a format appropriate for home use. It reads a binary output although the science is not binary in nature – the analysis has been simplified from that which clinicians use. Outside diagnostics, skin care treatments such as IPL depilatory machines and microdermabrasion kits

are good examples of equipment that has made the transition from a professional setting to the home via an intermediary.

There are limits to the migration of medical grade technologies. That limitation is twofold in the form of a technology maturity hurdle and an ethical hurdle. The maturity hurdle is straightforward in that some of the technologies we cite from the medical arena are simply decades (if ever) away from a price point that make them fit for the home. The ethical hurdle is about which diagnoses we can put into the hands of a consumer without the presence of a medical professional.

Figure 2: Examples of diagnostic technology migration

Source: Sagentia

Range of complexity

Potential diagnostic and monitoring devices cover a vast range of approaches: from simple, proxy diagnostics (not measuring physiology per se) such as timers on toothbrushes and smartphone UV index apps that infer sun protection factor requirements, to those that emerge from the adaptation of sophisticated technologies from the professional medical market.

Sophisticated medical technologies include clinical chemistry that measures blood analytes, through genetic analysis for disease susceptibility, to diagnostic imaging and tissue typing of tumours to determine treatment options. In the case of powerful genetic analysis tools, diagnostics deliver healthcare personalisation by exploration of characteristics associated with our genetic make up, from disease susceptibility to reaction to a drug regime. Companies have already begun to render this complex technology in a consumer-fit package. The company 23andMe has a service, enabled by a diagnostic which profiles consumers according to genotyping performed on a sample of their saliva. The service - including mailing of a test tube in which a saliva sample is collected and

then shipped back to a lab for screening - costs a few hundred dollars. The output is an online profile of an individual's propensity (ie risk factor) to develop a set of common chronic diseases (hypertension, diabetes, prostate cancer etc).

¬ Conclusion

Currently, there are few true diagnostic and monitoring devices in the mainstream consumer market aside from a few significant and well known indicators covering fertility, pregnancy, blood pressure and cholesterol testing. However, there is much potential to assist the consumer and deliver personalisation through the identification of products (consumables) for specific physiology needs and giving feedback to reinforce behavioural regimes. These benefits are very relevant to a CPG industry that relies on repeat purchase to be successful.

We are on the edge of a very exciting time with great potential to utilise the power of technology to satisfy the increasing demands of the savvy consumer. I have no doubt whatsoever that diagnostic and monitoring devices have the potential to deliver significant growth and value to health and beauty companies over the next decade.

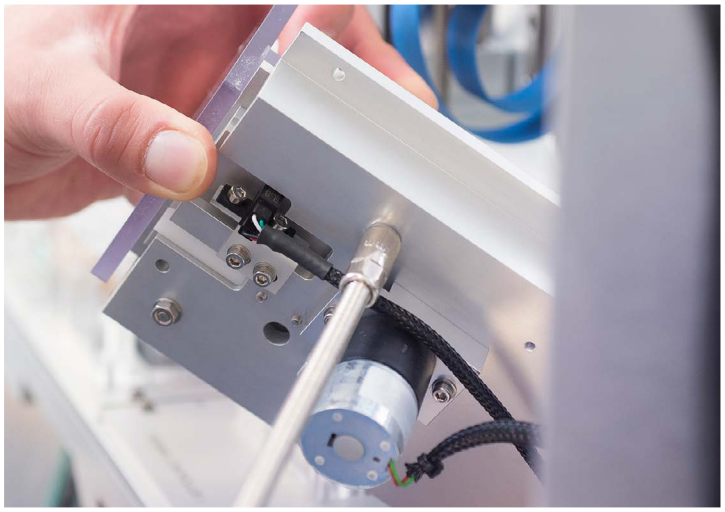
Consumer companies therefore face a new set of challenges; traditionally they are providers of specialised active ingredients not intelligent hardware. To succeed in the new world of feedback devices, they may need to explore licensing and acquisition to gain access to devices and expertise. The establishment of partnerships with technology providers and product designers will also be a likely requirement. There will need to be a shift in how products are presented in store and whether the devices require in-store operatives or are operated by the consumer at the point of sale.

References

[1]http://www.cosmeticsdesign-europe.com/Market-Trends/Technology-boom-drives-skin-care-device-market-growth
[2]Gartner Inc. 2010, "Market Insight: Medical Application a Driver in Growth of Semiconductors", Sergis Mushell, July 20, 2010
[3]ComScore Report "Women on the Web How Women are Shaping the Internet", June, 2010 © comScore Inc
[4]http://www.cosmeticsdesign-europe.com/Market-Trends/Technology-boom-drives-skin-care-device-market-growth
[5]ComScore Report "Women on the Web How Women are Shaping the Internet", June, 2010 © comScore Inc
[6]Laditka SB, Mastanduno MP, Laditka JN. Health care use of individuals with diabetes in an employer-based insurance population. *Arch Intern Med*. May 28 2001

sagentia

a **science group** company



About Sagentia

Sagentia is a global science, product and technology development company. Our mission is to help companies maximise the value of their investments in R&D. We partner with clients in the consumer, industrial, medical and oil & gas sectors to help them understand the technology and market landscape, decide their future strategy, solve the complex science and technology challenges and deliver commercially successful products.

Sagentia is a Science Group company.

About Science Group plc

Science Group plc offers independent advisory and leading-edge product development services focused on science and technology initiatives. Its specialist companies, Sagentia, Oakland Innovation, OTM Consulting and Leatherhead Food Research, collaborate closely with their clients in key vertical markets to deliver clear returns on technology and R&D investments. Science Group plc is listed on the London AIM stock exchange and has more than 350 employees, comprised of scientists, nutritionists, engineers, mathematicians and market experts.

Originally founded by Professor Gordon Edge as Scientific Generics in 1986, Science Group was one of the founding companies to form the globally recognised Cambridge, UK high technology and engineering cluster. Today Science Group continues to have its headquarters in Cambridge, UK with additional offices in London, Guildford, Epsom, Boston, Houston and Dubai.

info@sciencegroup.com
www.sciencegroup.com