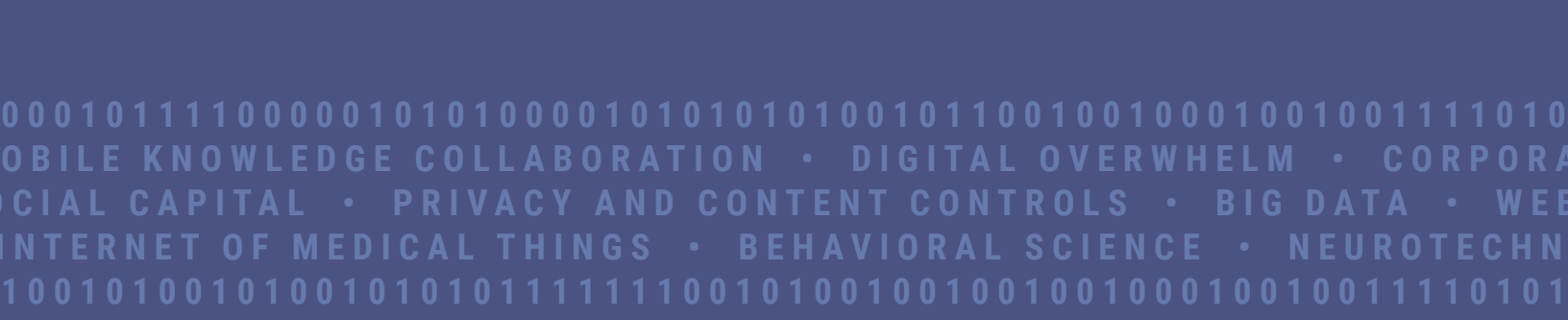
THE PSYCHOLOGY OF Digital Collaboration

The Ultimate Guide to Going Digital in Pharma

Natalie Yeadon
Co-Owner/Managing Director *at Impetus Digital*



Impetus Digital

WaterPark Place
20 Bay Street, 11th Floor
Toronto, Ontario, Canada
M5J 2N8

impetusdigital.com
connect@impetusdigital.com
+1 416-992-8557

Contents

Introduction

1 0 0 1 0 0 1 0 1 0 0 1 0 1 0 0 1 0 1 0 1 0 1 1 1 1 1 1 1 0 0 1 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 0 1 0 0 1 0 0 1 1 1 1 0 1

With the rapid advancements in digital technologies over the last few decades, the way we communicate with one another has changed dramatically in recent years. Especially, email, social media, and mobile proximity have completely transformed our day-to-day conversations with family, friends, colleagues, and customers. Twenty or 30 years ago, communicating with a client in another city or country would primarily occur over landlines—and only if the client was in proximity of their phone, would they be able to answer. Today, we can send a two-sentence email or instant message and get a reply right away or whenever convenient for the other person. However, despite all of its advantages, the increasing reliance on digital

technologies for communicating and collaborating also comes with some downsides.

In the first part of this eBook, I discuss the pros and cons of digitalization, focusing specifically on mobile knowledge collaboration, how to manage digital overwhelm, and social networks as the new digital currency.

In the second part, I take it one step further and discuss how digital technologies now play major roles in healthcare through the facilitation of collection of big data and the development of digital health tools and neurotechnologies. Finally, I touch upon the importance of behavioral science and behavioral marketing in the digital age.

There is no doubt that digital technologies and collaboration platforms, when used in a way that will improve productivity and effectiveness (and not the other way around) are essential for the success of any endeavor. This is particularly true for pharma, life science, and biotechnology companies looking to keep up or stay ahead of the competition. Digital tools, along with appropriate use of data and behavioral sciences, will be key not only for research purposes, but also for designing marketing strategies and making sure that the product or service reaches its target audience, ultimately improving the health of the patients. Furthermore, digital collaboration will help facilitate both communication between internal stakeholders, as well as between pharma teams and their key opinion leaders.

Part 1
Pros and Cons of Digitalization

CHAPTER 1 » THE ABCs OF MOBILE KNOWLEDGE COLLABORATION

At the center of the digital revolution are, no doubt, mobile phones. However, mobile phones are both a blessing and a curse. Why, you ask? Well, because they represent the paradox of modern day life—the illusion of being both "everywhere" and "nowhere" at the same time. **Everywhere**, because at the click of a button, we can be transported into our office, a discussion forum, an online working group, our child's classroom, or an online department store—all at the same time. **Nowhere**, because our attention can be so scattered over the internet that we are never really

"here" in the now. This is the great paradox of mobile proximity.

The Power of Mobile Proximity

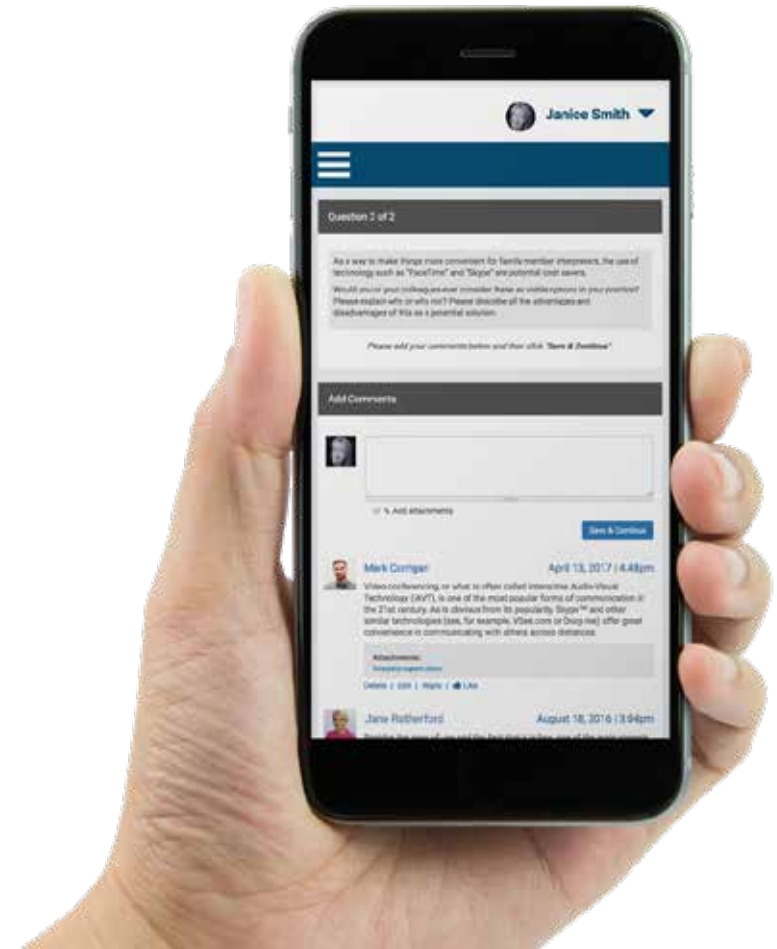
Mobile proximity allows people to work virtually and participate in meetings from anywhere in the world. Global work teams, which were once only graced upon corporations who could afford expensive flights and technologies to coordinate workgroups, is now available to any sized organization. It is a luxury that can now be afforded by the most basic startup. In fact, it is the fuel that allows any new company to actually thrive and grow in today's super accelerated market. Mobile proximity is as common today as the morning commute was a decade ago.

The ability to "be everywhere" simultaneously, with instantaneous communication with people in different locations, is often referred to as "ubiquitous interactions." One interesting question is: what does this mean for work environments? Mobile proximity ultimately enables virtual communication. We see this with Facebook comments, Twitter posts, and Instagram selfies. Communication is fast and unimpressed. Straight to the point. But can mobile proximity offer possibilities for knowledge collaboration in the workplace? What impact does and can it provide for joint virtual problem-solving and knowledge production?

Mobile Proximity in Action

To answer these questions, we can start with a platform that plays an important role in most people's lives: Wikipedia. This is an open platform that acts as a free online encyclopedia where people actively contribute and edit content. Contributors interact consistently with other people across the globe whom they do not know or speak with on a regular basis. There is only written shared content and nobody actually 'speaks' to anyone in real time. Yet, because of the shared intent to keep Wikipedia alive, relevant, and accurate, they collaborate with a shared vision and mission.

We also see this joint knowledge collaboration and ubiquitous online interactions through platforms such as Github. GitHub is a web-based hosting service that allows individuals from around the world to contribute source code and version control for open-source software projects. It provides access control and several collaboration features such as bug tracking, feature requests, task management, and wikis. The platform has almost 20 million users and over 57 million repositories. It is another great example of how ubiquitous interactions through mobile proximity amidst complete strangers can result in virtual problem-solving and knowledge production.



As a third example, we have observed knowledge collaboration in private company portals such as the Impetus InSite Platform®. Pharmaceutical companies can create private, custom-branded, password-protected online portals where they can engage with customer stakeholders through virtual advisory boards or working groups. The advisors can engage in asynchronous online activities through discussion forums or annotation exercises, allowing them to comment, provide insights, share with colleagues, and annotate documents. With mobile proximity, advisors from across the country or world can co-create consensus papers, journal articles, market access submissions, or medical education materials. Further, through these ubiquitous interactions, customer advisors can collaborate virtually from anywhere in the world to build knowledge banks.

Defining Mobile Ubiquity

Ubiquitous mobile connectivity assumes movement in either spatial, temporal, and/or contextual dimensions. **Spatial mobility** refers to geographical or physical movements of objects (i.e. people, data, or images). **Temporal mobility** refers to movement that allows time to be ordered,

> ***"Technology can accelerate life progresses but also depresses productivity."***

divided, and reconfigured in different, nonlinear ways. **Contextual mobility** refers to both the situatedness of interaction, as well as the transcending of traditional physical and spatial boundaries (i.e. home lives vs. work lives). All of these leverage technology to transcend space, time, and context. This, in turn, impacts our individual attention, participation, decision-making, and relationships.

With technology, parallel activities can be done 'simultaneously,' overcoming the traditional temporal boundaries of previous generations. Activities that once occurred concurrently or in a sequence of steps (i.e. information gathering, dissemination, discussion, deliberation, and deciding) can now be performed at the same time.

This can be a good thing, as it reduces the time it takes to "get things done." The "not so good" in this, however, is that it encourages excessive multitasking or the temptation to do so since it is just too easy not to. Research has found that the human brain has not evolved enough to focus on two difficult tasks at the same time. Doing this depletes our will power, reduces our overall effectiveness on each of the tasks, and decreases our overall well-being. Technology can accelerate life progresses but also depresses productivity, flow states, and overall happiness if not managed appropriately.

The Bottom Line on Ubiquity

Ultimately, ubiquitous mobile connectivity supports information searching,

communication, and transaction capabilities for people on the move. Mobility goes beyond just checking one's email while commuting on the train. It now allows individuals to work for global companies from anywhere in the world. Movement and connection can be integrated today in much more convenient and adaptable ways.

With mobile proximity, "work" and progress on the creation of knowledge are no longer limited by location or time criticality. Temporal structures that, at one time, influenced the sequential order in which activities had to be completed, have been removed. Consequently, multiple work streams can occur simultaneously.

Skills to Succeed with Mobile Proximity

Online social collaboration requires a unique set of social and cognitive behaviors that are not always experienced when people are working in physical proximity with each other. There is an increased need to be able to participate, acquire information, share data, and transfer knowledge with a certain degree of anonymity, autonomy, and technical confidence.

In face-to-face contexts, knowledge creation is typically conceptualized

as the convergence of ideas after a divergence has occurred. Divergence requires time for brainstorming, social identification, repeated interactions, goal sharing, and the expression of individual interdependence. This all takes time and can often feel frustrating to individuals who are very outcome-oriented and focused on the time required to achieve milestones.

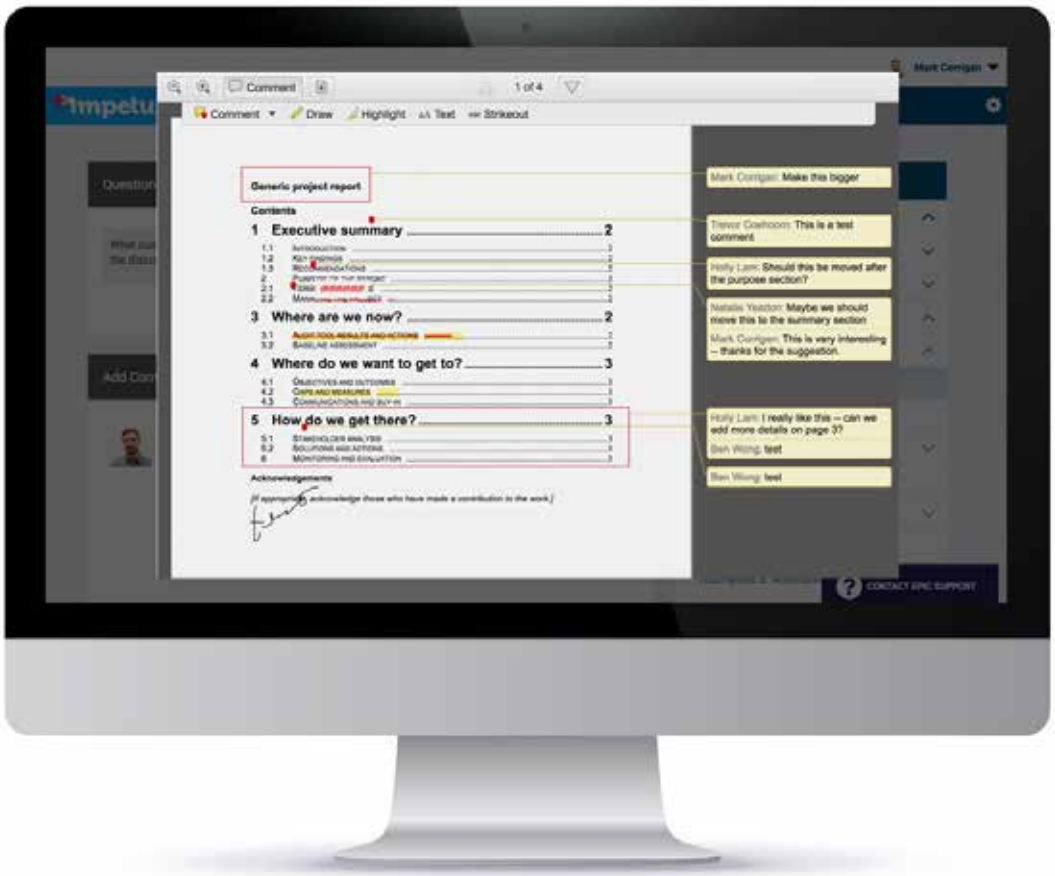
Online collaborations work differently. You can head to the finish line faster. Virtual teams can often be strangers or mere acquaintances. For example, they can be employees situated in different geographic areas who have never met in person. Other times, they can be investigators converging online to develop new clinical trial protocols or physician influencers co-creating new treatment algorithms. At the end of the day, they get together with a

finite start and stop time, with a very specific deliverable in mind.

In online platform teams, the individuals may not share the same interests and there is often very little "verbal" dialogue, if any. The communication between these virtual teams can come in the form of written comments, corrections, and editing. In addition, the members all have the outcome of the project in mind and share a vested interest or passion in having it completed.

Defining "Generative Capacity"

Mobile connectivity and proximal knowledge collaboration are especially unique for the "**generative capacity**" they provide. In other words, advanced digital technologies can enable innovation and the creation of new thinking in a perpetual and combinative manner. Generative capacity assumes the presence of heterogeneous resources and an open and participatory culture. It allows permeable boundaries, letting members move in and out freely. Further, it also enables a secure and intuitive virtual platform where the members can easily share, collaborate, and engage in transformational activities.



Annotation Tool on the Impetus InSite Platform®

Generative capacity requires input from everyone in the creative process. It is extremely inclusionary and allows for all voices to be heard equally. It is fueled by clear team objectives and quick turnaround times for feedback and knowledge transfer. Digital platforms, such as the Impetus InSite Platform® mentioned above, as well as Github and Wikipedia, just to name a few, provide a great deal of interaction and transparency, as everything is tracked and attributable to specific individuals. There is no hiding. Everything and everyone are now an open book.

Online cultures need to be cultivated and are as important to create and maintain as those for brick and mortar companies. Mobile individuals all have different psychologies and mindsets related to the opportunities and constraints of the virtual collaboration and/or the platform or technology they are using. Some individuals might perceive the level of online transparency to be concerning while others perceive the ability to asynchronously participate in work projects as liberating and less constraining. Some may find the virtual environment lonely, while others appreciate the fewer disturbances or distractions.

Defining "Affordances"

Despite the high level of individualization of behaviors and perceptions, which allow virtual stakeholders to contribute in complex digital environments, the members can still converge to deliver on projects and collective goals. All of this may require individuals to acquire more complex online cognitive and social skills, as well as new processes.

The success of mobile knowledge creation depends on the mindset of its members. In other words, there are certain "**affordances**" or "**emergent functional properties**" that mobile proximal individuals will need to perceive in order for their virtual collaboration to occur seamlessly and effectively. Affordances are highly situational orientations and judgments that are not only affected by the tasks at hand but by all the individual preferences, choices, moods, and personalities thrown into the mix. There are three key affordances that need to be considered. These are ubiquitous interaction affordances,

Affordances of Human Motivation

knowledge processing affordances, and human motivations affordances.

Affordances of Ubiquitous Interaction

This type of interaction involves the management of multiple contexts (i.e. micro, local, and remote) and the ongoing interactions that occur between these contexts. There are four key affordances of a ubiquitous interaction: connectors, filters, mediators, and coordinators.

Connectors are unprioritized encounters, such as invitations to connect on a platform, emails, text messages, and alerts. **Filters**, on the other hand, prioritize and manage the connectors and decide on their current level of importance. **Mediators** support the ongoing relationships within the group or virtual team by incorporating memories of past conversations without filtering or prioritizing the current interactions. **Coordinators** support the filtered interactions of the current virtual relationships while remembering the content of conversations, tracking status, and outstanding actions.

By studying the Impetus InSite Platform® as an example, we can see how these affordances actually come into play. The connectors are the emails and reminder text messages used to communicate with the advisors. The advisory board lead from the sponsoring pharmaceutical manufacturer acts as the filter to streamline the content that ultimately goes out to their advisory board members. The pharma lead and/or a hired customer advisor acts as the mediator of the online discussions by responding to the comments from the advisory board members. Finally, Impetus acts as the coordinator to ensure that the online discussions, relationships, tracking, and reporting are facilitated. All affordances must work synchronously to make the virtual or ubiquitous interactions successful.

Affordances of Knowledge Processing

Because of mobile proximity, knowledge creation can now occur in virtual workplaces that no longer require people to be working in the same geographical location. In fact, knowledge processing can actually occur with people geographically dispersed, who may not be known to each other, share the same common interests, or regularly engage in verbal dialogue. Knowledge processing comprises three key affordances:

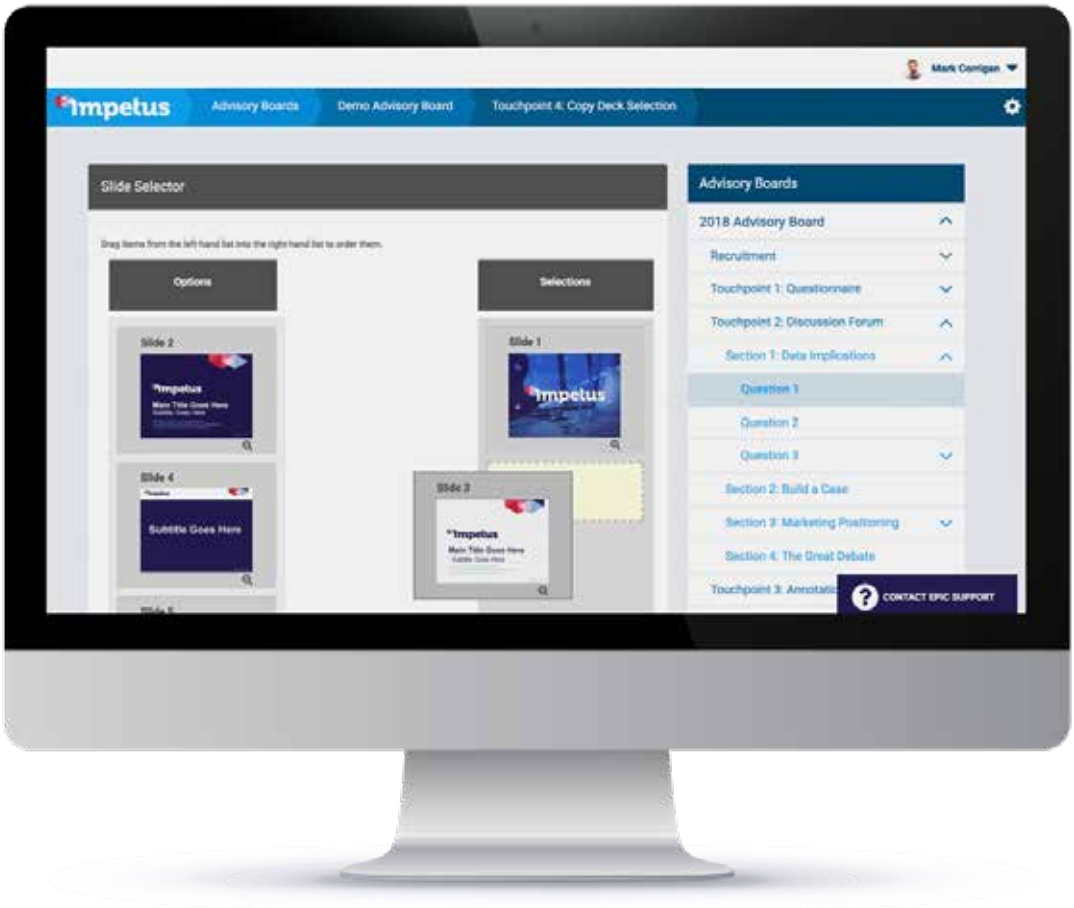
reviewability, **recombinability**, and **experimentation**.

Reviewability

Reviewability refers to the ability to see not just the current bank of knowledge, but also what has been created in the past and a clear set of directions to reach future goals. It is the link that pieces all knowledge, past, current, and future, and provides a platform and process to do this. Virtual platforms that allow members to view discussion threads by topic and that get dated and organized in a "story flow" format provide context for members who join the active discussion late. The "tribal knowledge" that is rarely captured in actual text, is captured in the arrangement context of the asynchronous online discussions. Ultimately, you want a platform that has flexibility for its members to add attachments, post comments, and annotate documents, and for this user-generated content to be visible and reviewable by all other members.

Recombinability

Recombinability refers to the ability to associate, modify, and build on others' contributions and ideas. This



Selection Tool on the Impetus InSite Platform®

helps promote creativity and innovation and is the launching point for knowledge-sharing and creation. Platforms that provide asynchronous online discussion forums with voting, reply, and notification features help facilitate this. In addition, platforms should also incorporate other flexible tools such as "sorter" and "annotation" tools to help prioritize and provide granular feedback on actual documents being co-created by its virtual members.

Experimentation

Experimentation is the speed and ease at which ideas, knowledge, or specific deliverables can be shared, tested, and measured. This requires openness to novel ideas, the capacity to see value in diverse opinions, and the means to capture feedback quickly. Experimentation is a product of both mindset and culture and needs to properly leverage technology to "fail fast and fail often." Online platforms are excellent tools to increase the number and frequency of random collisions by the virtual members themselves and their ideas. Getting people to meet in person is expensive and frequently inefficient as meeting agendas often follow the format of "throw enough to the wall and hope something sticks." Ideas are not just generated at a single point in time such as during a live meeting. Knowledge creation is an "iterative" process that requires time, rumination, and communication tools.

Affordances of Human Motivation

Human motivation relates to meeting people's psychological, cognitive, social, and emotional needs. Knowledge collaboration requires effort to engage in purposeful behavior, aimed toward achieving a particular goal or avoiding a negative outcome. Motivation of the members is critical in order to positively influence the energy and direction of any virtual collaborative effort.

Motivational affordance is based on five different needs:

1) autonomy and self,
2) competence and achievement,
3) social identification or social relatedness,
4) power and control, and
5) emotion and affect.

Online platforms should allow virtual team members, each with their own unique perceptions and personalities, to have their personal needs met. This will result in much more lively, motivated, and inspired knowledge

collaborations. Platforms need to be simple to use and intuitive, and should not be viewed as a barrier to entry or use because of undue complexity or ambiguity.

The Future of Mobile Collaboration

Virtual knowledge creation platforms are the bridge to fast and large-scale future innovation. Optimization occurs when they can support all three facets of affordances simultaneously. Specifically, the technology and processes need to provide for ubiquitous interactions, knowledge processing and accumulation, and human motivation.

Mobile knowledge collaboration requires real-time information and communication, memory of past interactions, virtual accessibility from anywhere in the world, processing and cumulative capabilities, and the motivation of its members to connect virtually.

Knowledge is everywhere. It is the integration of people, processes, and technology that will allow for the expansion of our current knowledge base. In turn, it will provide for exponential growth and possibility, both in the pharmaceutical industry and the world in general.

Chapter 2 » How to Manage "Digital Overwhelm"

(AND STAY SANE IN THE PROCESS!)

An important feature of mobile knowledge collaboration is email correspondence. Email has certainly become run-of-the-mill since its inception circa 1972. Little did Ray Tomlinson, the man credited with inventing email, know that over **3.7 billion people** would be emailing in 2018! The rise of email is largely due to our shared belief that it is more efficient than face-to-face meetings and phone calls. Moreover, it has enabled information-sharing with more diverse sources when compared to the traditional single-channel memos (remember those!?). An email was once seen as the ultimate savior in connecting more people more of the time. We, of course, know better now in the age of "digital overwhelm."

The Email Paradox

Alas, the not-so-nice side of email has reared its ugly head. We often hear the cries of "overload" when we think about our inboxes that never seem to empty. Today, it is impossible for most of us to get our emails down to "zero." In the rare cases when this does happen, it is but a moment's celebration before new messages start pouring in.

"**Email overload**" correlates with the number and length of emails received, and the time it takes to process and respond to each. The **immediacy** of receiving emails has caused the undue pressure we feel to respond quickly. It is also the culprit for generating many unanticipated tasks in our calendars. Email causes innumerable **interruptions** daily; it makes us feel out of control when it comes to managing our time. Finally, email forces us to **switch tasks** continuously and challenges us to enact different **roles** simultaneously. We, in effect, lose our sense of focus and flow.

Human beings have a limited capacity to receive, interpret, assimilate, and apply information. When our limits

are exceeded, our **cognitive performance** declines. This results in the inability to make decisions, prioritize, or organize information, thoughts, and processes. Hence lies the "**email paradox**." On the one hand, email has facilitated widespread information distribution and reduced information delays. On the other, it has overwhelmed our processing capabilities and brought about feelings of stress, inefficiency, demotivation, and confusion.

The Effects of Sending "One to Many"

Email volume is dependent on many factors, including job characteristics and organizational culture. An average employee will receive slightly more than twice the number of messages they send. With our ability to send "one to many," the marginal cost per message experienced by senders is dramatically reduced when compared to traditional tools like "snail mail." As a result, senders enjoy a disproportionate share of the email benefits while email receivers bear the brunt of the proverbial costs.

A typical employee will receive upwards of **350 email messages per week** (70 messages per workday), while an executive will receive upwards of **300 messages a day**! On average, one-third of messages received are considered unnecessary and can be quickly deleted. The other necessary messages will require anywhere from **2-5 minutes** to process, as they need to be read and responded to with attention to proper word choices, correct spelling and grammar, and the correct recipient list. As a result, recipients spend a lot of their time and energy reading and responding to others' information requests. They also tend to interrupt their own work to continuously monitor incoming emails. They do so to satisfy the senders' expectations of a timely reply. This all takes time. In fact, the average employee will spend approximately **2.9 hours/day** on email, while an executive can spend upwards of **10.8 hours**!

The Financial Impact of Email

According to some studies, employees will take 24 minutes on average to get back into the groove of their work

after checking email. They will also check their email at least 50 times per day and use instant messaging. These numbers are steadily increasing as we incorporate the "internet of things" into our lives. The average worker will **lose at least 6 hours per week** to email interruptions and 2 hours per week to processing unnecessary email. This is a total productivity loss of 8 hours per week just on email alone. It comes out to **392 hours per year—per employee**. For an organization with 50,000 employees, this can translate to an approximate **loss of $1B** in productive employee time!

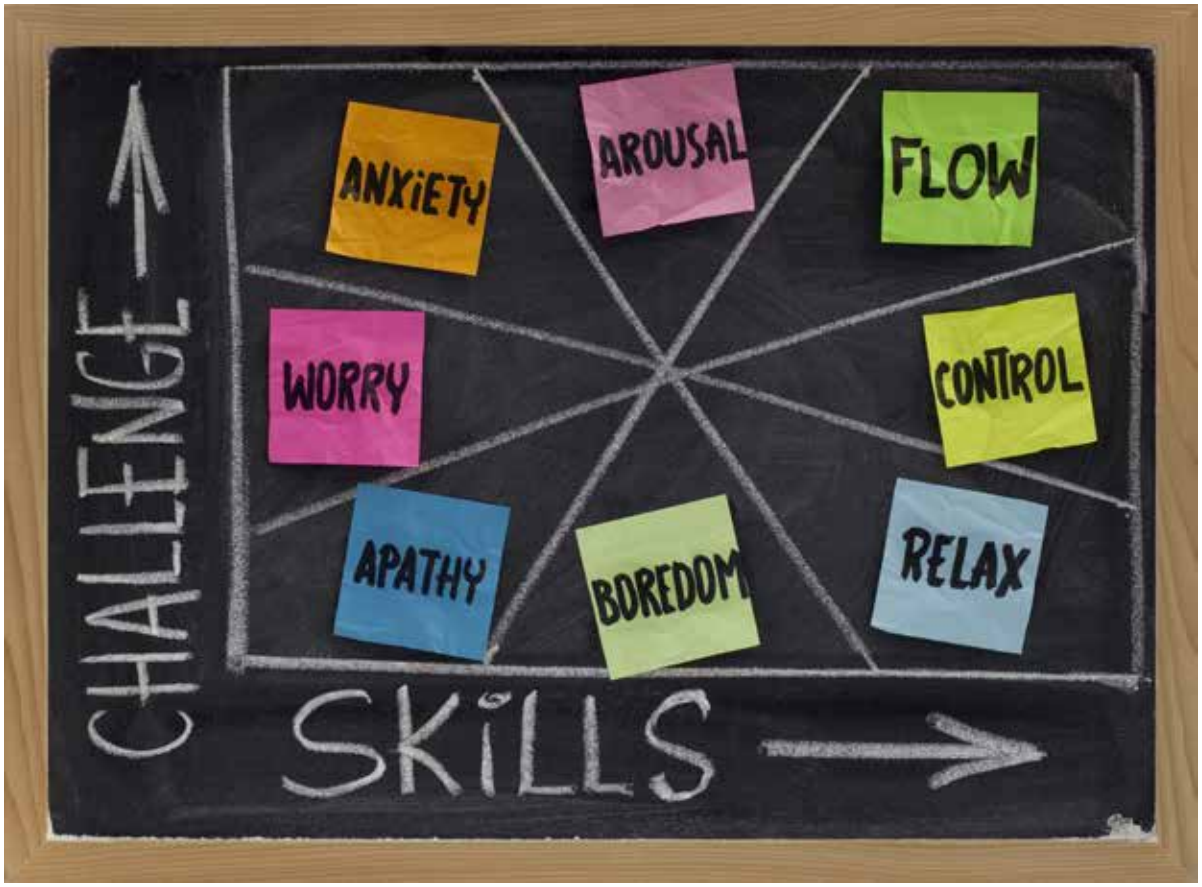
Email and Its Effects on Cognitive Performance

In addition to corporate financial losses, other employee productivity parameters are also affected. IQ scores have been used historically by psychologists when comparing performance in distracted versus non-distracted states. They refer to the degradation in focal task performance as "**dual-task interference**," when an individual tries to perform a second task simultaneously. The average employee, while distracted by email, exhibits twice the degradation in IQ scores during task execution. This is the same change in IQ scores exhibited by someone who has just smoked marijuana!

In today's tech-driven world, where we have the increased pressure to "empty our inboxes," we are forever multitasking. You can see this in checking email while in meetings or texting while driving. It starts in the morning when checking our social media feeds while, at the same time, feeding our dog or going to the bathroom. We kid ourselves into believing that doing multiple tasks at the same time somehow increases our productivity. The sad reality is that studies completely disprove this belief.

What's the Truth?

"High media multitaskers," who frequently engage in five or more simultaneous information streams, score poorly on standard judgment, recall, and reaction times when compared to "**low media multitaskers**." Outside of media, studies measuring the effects of high **task switching** show similar results. The scary thing is that multitaskers and frequent task switchers usually feel more confident about their performance than those engaging with less divergent efforts. Decision-makers, who are bombarded with more information, tend to feel more confident



about their decision-making than those with access to less information. Sadly, the "information rich" people usually end up making worse decisions. Continuous churning through email has given us a **false sense of control** over our work. We have also internalized the cultural belief that more information is better, safer, and more reliable. Little did we know that besides the possibility of "paralysis by analysis," more information has actually numbed our higher faculties.

It is recognized that an individual's information-processing capacity will vary over time. It can fluctuate with mental and physical energy levels, as well as other external conditions. Our natural limitations for information perception, interpretation, and judgment are exacerbated by our common email practices of constant interruptions, task-switching, and multitasking. Our daily routines of consuming social media, text messages, and email have eroded our capacity to assimilate and apply new knowledge, to successfully accomplish tasks, and to make decisions. Unfortunately, our boosted self-confidence, buoyed by the banks of "at your fingertips" information, delays our recognition of underperformance due to overload.

"The scary thing is that multitaskers and frequent task switchers usually feel more confident about their performance than those engaging with less divergent efforts."

What is Overload?

When we finally realize that, despite our best efforts, we are underperforming, the tragic reality of "digital overwhelms" sets in. **Information overload** is a multi-dimensional experience incorporating factors such as time, tasks, relationships, and a sense of control, or lack thereof. In technical terms, overload can be defined as a condition where the cognitive demands associated with information processing exceeds an individual's information processing capacity. Our cognitive performance decline can be detected by our inability to make accurate "signal-noise" distinctions and situation assessments. In addition, we become less efficient in making high-quality decisions. When we hit the "overwhelm" stage, it can affect our long-term memory, attention levels, comprehension, retention, and recall. It can also result in an individual experiencing exhaustion, poor physical health, reduced relationship satisfaction, and other psychosomatic symptoms.

How Email Can Contribute to Social Overload

Another reality today is "digital overwhelm" at the social level. **Social overload** can occur when the number and variety of social exposures and the associated social information received exceed an individual's **interaction capacity**. In traditional office environments, workers use physical barriers—walls, doors, and the distance between employees—as ways to segregate, contain, and "**serialize**" their interactions and their accompanying role demands. These structures, in effect, created the container that people needed to protect their **personal boundaries** and to give them a refuge in which to recharge.

With the new world of "hoteling," reservable workspaces, virtual offices, and co-working spaces, there is less protection and more pressure to be available at all times. Interestingly, people living in more densely-populated urban areas have a tendency to unconsciously contract the physical range of their social circle, effectively limiting their number of relationships and day-to-day encounters. This is their way of creating "**space**" in their day in order to recharge and decompress.

These same individuals, in contrast, will increase the density of their computer-mediated world in order to further expand their circle of online encounters. No wonder we see individuals engrossed in their phones

even when in the midst of family members or colleagues. We become more attached to our virtual world and social connections as we have unconsciously detached from the real world in order to protect our limited capacity for social interaction.

Drawing the Line

The lines between when and how to engage in professional social media sites, such as LinkedIn; social sites, such as Facebook and Instagram; and company chat rooms, such as Yammer or Slack, have blurred. We are spending time at work updating our Snapchat account and time at home connecting with colleagues from overseas. In practice, the boundaries between these domains are becoming less distinct, further increasing the social load employees encounter during work hours. In any given hour of the workday, one may receive messages from one's boss, spouse, client, child's soccer coach, vendor, child, dentist, friend, organization, and former classmate, each with a unique request and a particular time horizon for responding. Not only do we have to cognitively process the content of the message and reply appropriately, but each interaction must be prioritized within the broader ecology of one's relational life. Work-life balance has transmuted into **work-life integration**.

How to Assess and Manage Email Overload

There are a number of ways to monitor and combat email overload. The first step is to take an inventory of the number, length, type, and importance of emails that are received within a specific period of time. Next, one must determine the amount of time that it is taking to process each message type, and the time required to complete any tasks necessary to respond to the received messages. Other dependent variables include the average time per day spent processing email communication, both within and outside of regular work hours, the average elapsed time between message

receipt and message response for each message type, and the proportion of each day's messages that go unread.

Evaluation is Important

Descriptive statistics of an employee's interaction partners over the course of a workday and the number of different social contexts represented by these contacts should also be evaluated. Subjective data, such as ratings of perceived stress or feeling focused versus fragmented at intervals throughout the study period (e.g. hourly, daily) should be evaluated and tracked. These ratings would then need to be mapped against the social density of the interval (i.e. the number of unique message senders and the number of discrete social contexts represented by that interval's message senders).

It could also be useful to measure the time required to compose response messages and the appropriateness and tone of the language used. Did they remember to add the attachment they mentioned? Did they include the right individuals in the recipient list? As individuals become socially overloaded, they may become less adept at making role transitions. Consequently, it may require an employee longer to compose a relationally-appropriate response, or they may respond quickly but without making the appropriate shifts in vocabulary and tone. It is important to note that when an employee's **interaction density** increases due to multiple professional and personal roles, they can have a more difficult time with "**recovery**" strategies. This can lead to less ability to psychologically detach, relax, and master their feelings of autonomy.

Strategies for Overcoming "Digital Overwhelm"

There are a number of strategies that organizations can incorporate as a means to manage email overload, with varying degrees of effectiveness and impact. A few of these are:

- Filtering and message threading (e.g. separate urgent vs. non-urgent emails using tools such as SaneBox)
- Creating organizational email policies incorporating communication restrictions (i.e. no work emails on weekends)
- Setting rules around subject lines, "to" vs. "cc" prioritization, batch processing, and reminder follow-ups
- Writing guidelines for selecting which medium to use for which type of communication (e.g. use instant messaging for task-related communication only and reserve

email for non-time-sensitive content, or to document decisions)
- Setting rules on how and when to use "out of office" or "do not disturb" notifiers

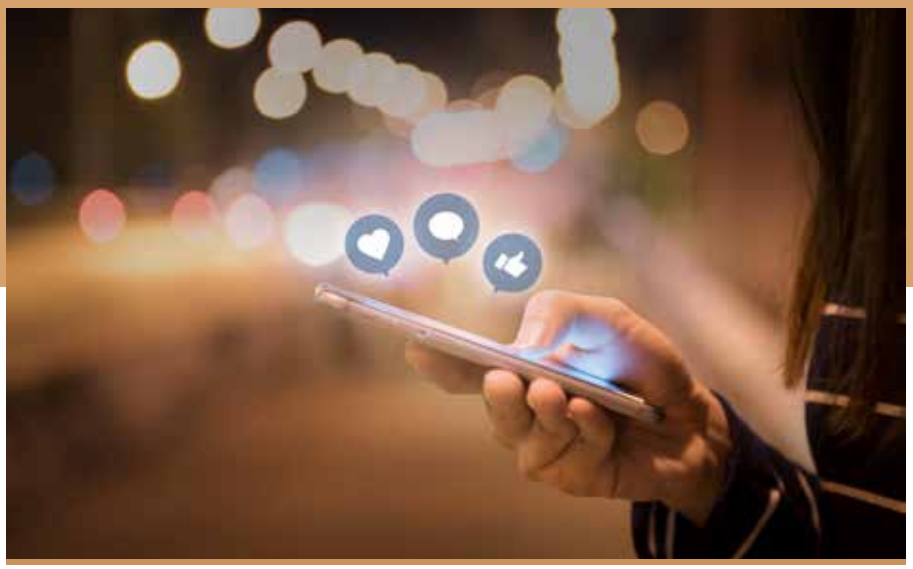
Interestingly, companies are also leveraging synchronous channels such as web meetings to create a sense of proximal interaction, which is often missing in our virtual world. People still want to feel **connected** to the greater ecosystem in which they work and with their colleagues who they are collaborating with. Working in vacuums or in "transient offices," where the average employee feels like a displaced person, has caused many workers to migrate to coffee shops in order to stay motivated and connected with other human beings.

The Exciting Future of Digital Communication

Increasing numbers of company-branded portals, used to incorporate threaded projects and to capture tribal knowledge among colleagues and customers, have surfaced recently. These are excellent asynchronous forums that reduce email overload. This is because project work can be captured in private, company-branded, online spaces. Convenient, asynchronous communication, sharing, and collaboration can occur unobtrusively. They assist in giving us processing time to respond without feeling the pressure to react to an email. These kinds of portals provide a balance between adequate social density while maintaining individual boundaries and structure to recharge. As a result, private online portals have dramatically increased the level of customer engagement and brand advocacy.

Nevertheless, it is clear that email will continue to drive both our work and life. It is undoubtedly here to stay, and we cannot ignore that it has expanded our data exchange to a new level beyond belief. As we step on the precipice of artificial intelligence (AI), the need for rapid information exchange and big data analysis becomes even more pronounced. It is up to us now to leverage these tools, email included, so that they help optimize our potential without deterring from our personal and professional progress. By taking active measures to monitor our sources of information, work, and social overload, we can create solutions to combat "digital overwhelm" and to protect our decision-making prowess.

Chapter 3 » Are Online Social Networks the New Corporate Currency?



Much like email, online social networks (OSNs) play important roles in how businesses establish contacts, improve processes, and maintain competitiveness. Unfortunately, they also tend to expose not only our positive professional attributes and successes, but also our scars and blemishes. This level of transparency leaves an indelible footprint in our digital ecosystem. It also imparts a feeling of continuous vulnerability and exposure, with no place to hide. In this chapter, I explore how OSNs interface with our occupational contexts, reshaping the way we work and play.

Welcome to the World of Online Social Networks

Online social networks, defined as web-based services used for social interactions, first emerged in 1997. Since then, there has been exponential growth, with literally billions of people using OSNs worldwide. Today, Facebook, the world's largest OSN, has over 2.2 billion unique users. This platform merges all nationalities, ethnicities, cultures, and genders, and finds a common ground for connection. OSNs help create balanced relationships and minimize separation caused by inequalities in status, income, or other societal divisions. Specifically, they do so by acting as a type of social **democratizing** tool.

People reportedly spend thrice as much time on Facebook than on Google. This comes out to approximately 7 hours per month. However, some people spend that much time on Facebook per day! Facebook enjoys 26% of the world's total social media usage, with the largest number of accounts residing in India. Women typically spend 30% more time on OSNs than men. OSNs have come to represent more than just sharing selfies, swapping vacation stories, or connecting with family and friends. For example, they are being increasingly used in criminal investigations and college disciplinary hearings. With recent changes to Facebook's business model, it has become one of the world's largest advertisement platforms for businesses. Further, it is now a key distribution channel for political and social awareness campaigns.

It is important to clearly define the differences between internal OSNs (often referred to as intranet sites) and external OSNs. Intranet sites can be custom-built, password-protected internal corporate platforms; sites sanctioned by third-party suppliers such as Yammer or Igloo; or internal messaging hubs such as Slack or HipChat. Below, I discuss the two largest public OSNs, Facebook and LinkedIn, considering their sheer membership sizes and their immense influence on professional businesses.

Facebook

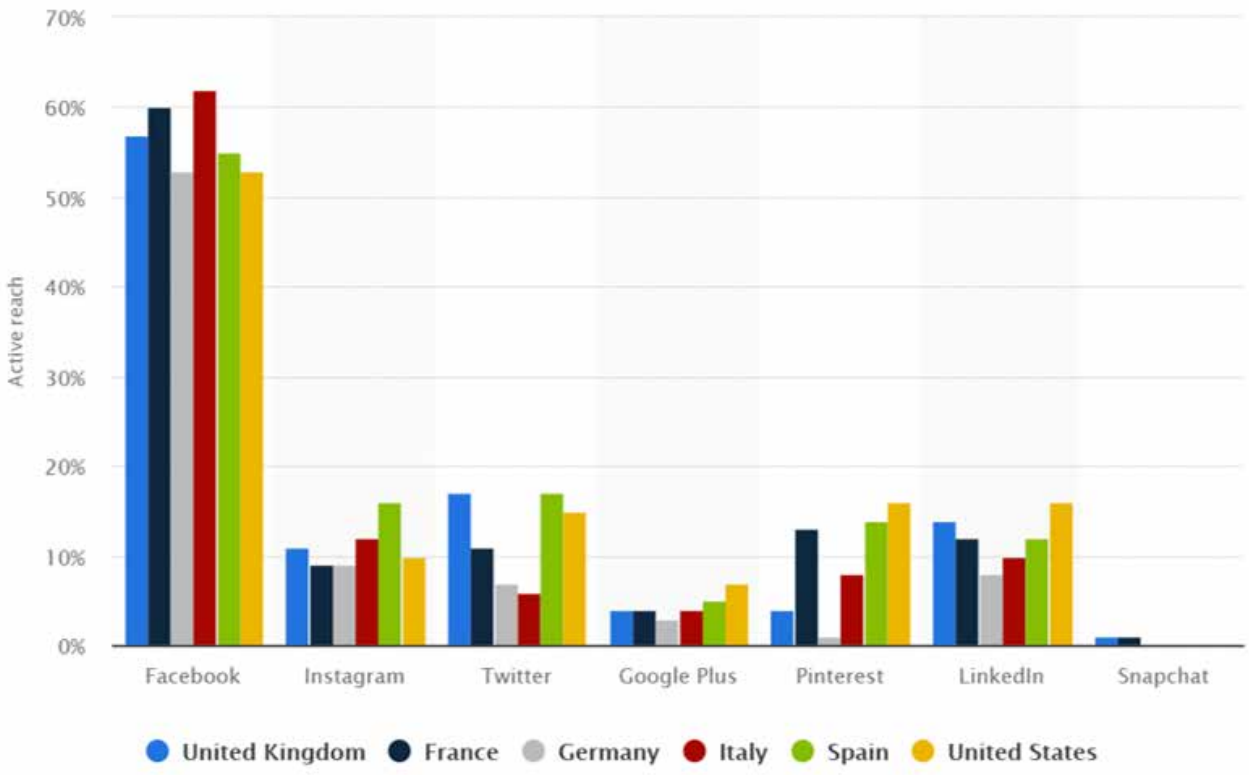
Facebook, established in 2004, provides an opportunity to build a profile and communicate with other people in a non-work related way. This is done through the posting or

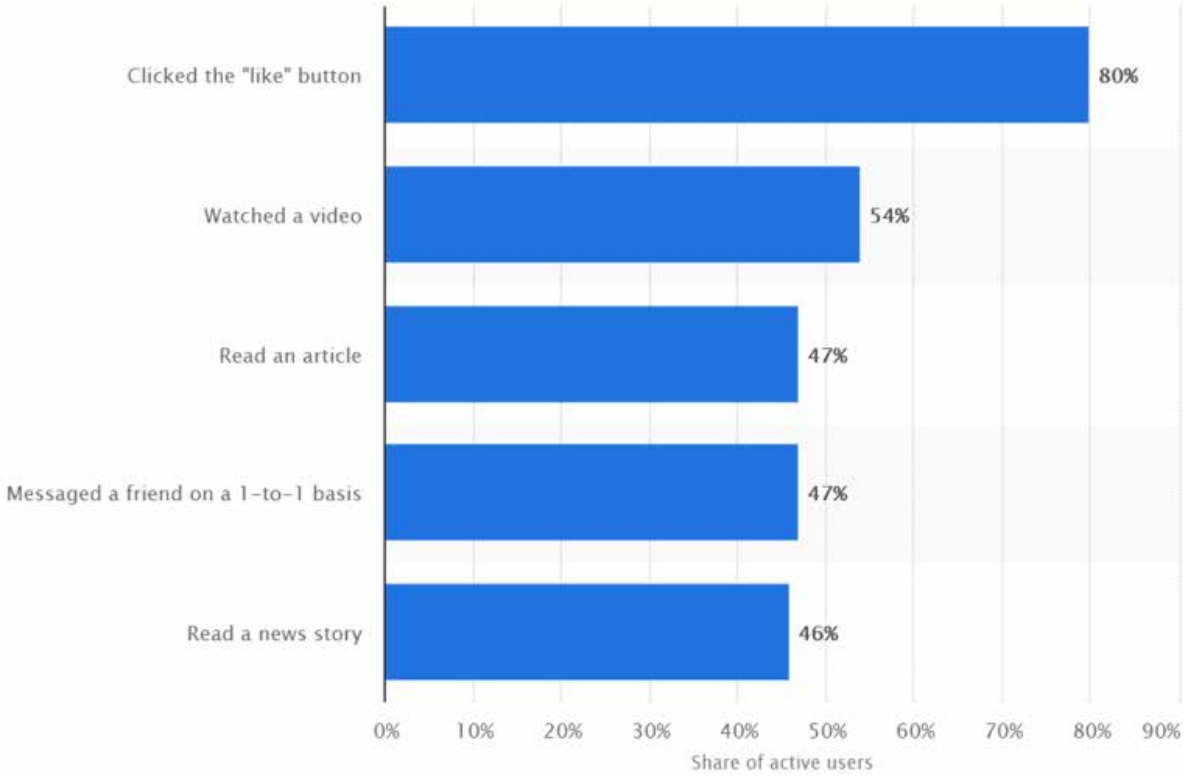
sharing of pictures/articles/videos, writing content, liking comments or pages, setting up profile preferences, and joining groups. It also allows people to attend events, play games, and interact with thousands of other third-party integrations, among many other features.

Further, Facebook enables businesses to create advertisements and boosted company page content to create more "Facebook likes," mailing list subscribers, and general engagement. This results in increased opportunities for businesses to sell their products or services to targeted audiences that fit their specific customer avatar. The level of customer segmentation and specificity has become so granular that companies can now literally target people of a specific sex, age, socioeconomic status, geography, or language. Moreover, companies can target those who like specific products, celebrities, leadership figures, or services. The targeting possibilities are endless!

LinkedIn

LinkedIn, created in 2003, is an OSN specifically geared towards professional and business networking. It is especially useful for job searches, discovering sales leads, and connecting with potential business partners or affiliates. Recently, it has become the number one spot for professional





connection and the stomping ground for human resource and recruitment professionals. The users are often active job seekers and people wanting to connect with classmates/colleagues or looking for information on other companies/people. Professionals can create, join, and share ideas and content in private groups; send and receive InMail; and connect with potential employers/employees. LinkedIn also allows professionals to follow daily news updates, write articles, and join online courses. Additionally, companies can create their own corporate page where they can publish content that will appear on the newsfeed.

LinkedIn, like Facebook, affords companies the opportunity to advertise, albeit it is less targeted and much more expensive. The LinkedIn profiles, unlike on Facebook, rarely change and often reflect an individual's resume. This OSN also requires individuals to purchase premium plans in order to connect more broadly with less direct connections through InMail, to post jobs, advertise, or create more specific reference searches.

Patterns of Use

It is no surprise that 93% of people use Facebook for personal reasons, while only 48% of people use LinkedIn for this purpose. Conversely, 36% of

> ***"Online, everyone becomes equal. You no longer have to slog through menial work for years before capturing the attention of the corporate C-suite."***

people use Facebook for professional purposes, while 86% use LinkedIn for business. Of the most avid LinkedIn users, 38% and 10% are from the computing/technology field and financial services industry, respectively. These stats are quickly changing as Facebook continues to modify its advertising platform to attract more businesses wanting to generate leads for mainly B2C companies.

Interestingly, engineering and marketing teams use internal intranet sites and chat rooms more extensively than sales, finance, or operations teams. Sixty-one percent of people access OSNs at least once per day, while 15% use them "constantly throughout the day." This comes out to an average of 18 minutes of a typical working day, or 4% of their time. Seventy-two percent of Facebook users are under the age of 25, while 46% are aged over 46 years. LinkedIn, on the other hand, has 64% of its users ranging between 26 and 45 years in age.

Employees typically use OSNs for professional networking, learning about colleagues, reconnecting with previous colleagues, research, sales prospecting, marketing communications with customers, setting up meetings with prospects, recruiting, and sharing work-related information. OSNs are ideal for people who want to build their social capital, which, in today's terms, is the new value currency. Online, everyone becomes equal. You no longer have to slog through menial work for years before capturing the attention of the corporate C-suite. By gaining visibility online, exposure to personality, and having the opportunity to campaign for projects and ideas without the meddling hands of filtering managers,

"newbies" can catapult their careers much faster than they have in the past.

Social Searching

OSNs are excellent for gathering information on people you are not yet familiar with or to learn more about people you have just met. In addition, many employers routinely navigate OSNs before interviewing prospective job applicants. Having an active LinkedIn profile, with frequent post "likes" and "comments" or shared articles, can benefit a user by increasing their profile attractiveness. Unfortunately, many people keep their ideas and opinions to themselves in fear that it might "rock the boat" or sound rebellious to the corporate leadership. Additionally, many stories of inappropriate Facebook postings, pictures, and remarks about bosses, as well as comments about unsubstantiated vacations or days off, have resulted in employee terminations. As a result, several OSNs are facing increased scrutiny of their privacy settings.

Social Browsing

People will engage in social browsing if they are looking for experts to solve a particular challenge. OSNs are perfect for this, as they allow for "**word tagging**" and complex search options and filters to drill down on the ideal candidates. Although LinkedIn is more popular for social browsing than Facebook is, Facebook is quickly catching up with the plethora of celebrity and guru fan pages, as well as private groups spanning every imaginable topic. There are now over 65 million company pages posted on

Facebook. Both OSNs are excellent for market research, as meta tags can lead inquirers to a slew of other associated connections, recommendations, and references, as well as brands, events, topics, and people's "likes" and "dislikes." Consequently, personality "avatars" can be created from these OSNs.

For entrepreneurs, OSNs provide a bottomless pit of product and market opportunities worldwide. OSNs have effectively extended the reach and scalability of entrepreneurs, which can result in overnight success. This is because OSNs increase the average person's "affection" rate. That is, how many people they can positively affect and provide value to in shorter periods of time and with less resources than in more traditional "in-person" formats.

Information Seeking

OSNs are a quick and simple way to access information. Through polls, status updates, and discussion forums in groups, information can be efficiently accessed and shared. Other information-specific OSNs such as Quora and Yahoo Answers have also become go-to places to find experts on specific topics and challenges. Knowledge is now free for the asking and available at the click of a mouse.

With the ability for OSNs to attract like-minded people into "groups," information, people, and financial resources can now be "crowd-sourced" through OSNs.

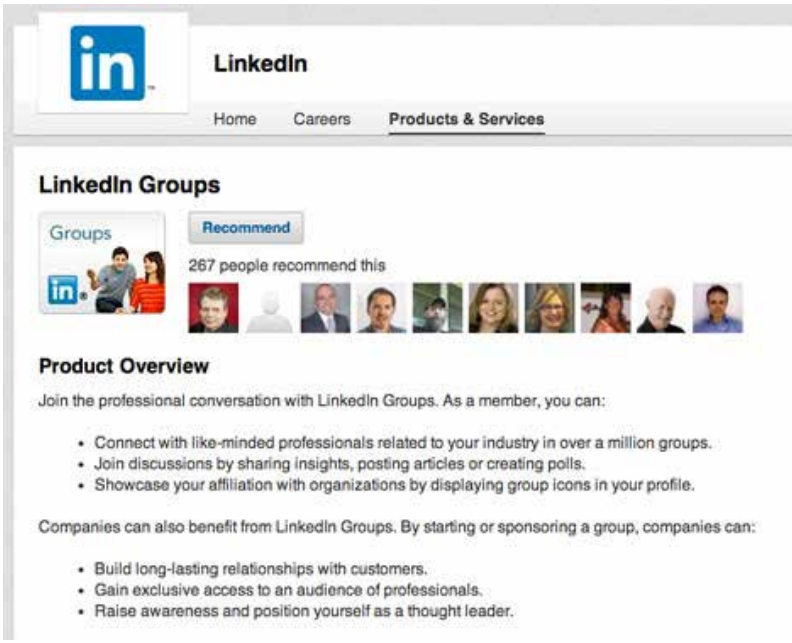
People and companies are gravitating towards sites such as Kickstarter and Upwork to source money and skilled labor, respectively, from a global pool. Rote tasks such as video transcription and sales lead generation are inexpensively outsourced, increasing company profitability. The increased reliance on resource OSNs, business artificial intelligence, chatbots, and robotics has effectively freed up employees to focus on the more creative and strategic elements of their job.

One fascinating thing about these OSNs is that information providers are inherently "rated" by their peers by the sheer number of likes and shares they receive. These "under current" scoring systems help separate trustworthy sources from those considered less reputable. Hence, the age-old question of "who do I believe" is more easily circumvented. The built-in networking setups of these OSNs also make it easy for recruiters and employers to seek out qualified and socially connected (therefore indirectly "referenced") prospects for job positions.

Online Interest Groups

OSNs have the incredible ability to merge like-minded individuals into discrete interest groups. Individuals, regardless of geography, gender, or other characteristics, can congregate online to share, commiserate, and build ideas and movements together. Similarly, workgroups can set up online teams to help accelerate trust building and facilitate communication and work deliverables. The same can be said about private company OSNs or white-labelled platforms such as the Impetus InSite Platform® used to communicate and connect with customer advisors on a series of brand- and company-related issues. All scenarios have been shown to increase productivity and overall member satisfaction. Intrinsic to all of these is the creation of "exclusive" membership, which gives people a sense of "entitlement" and "special status." The level of peer influence makes the members want to work harder to stay in the private group.

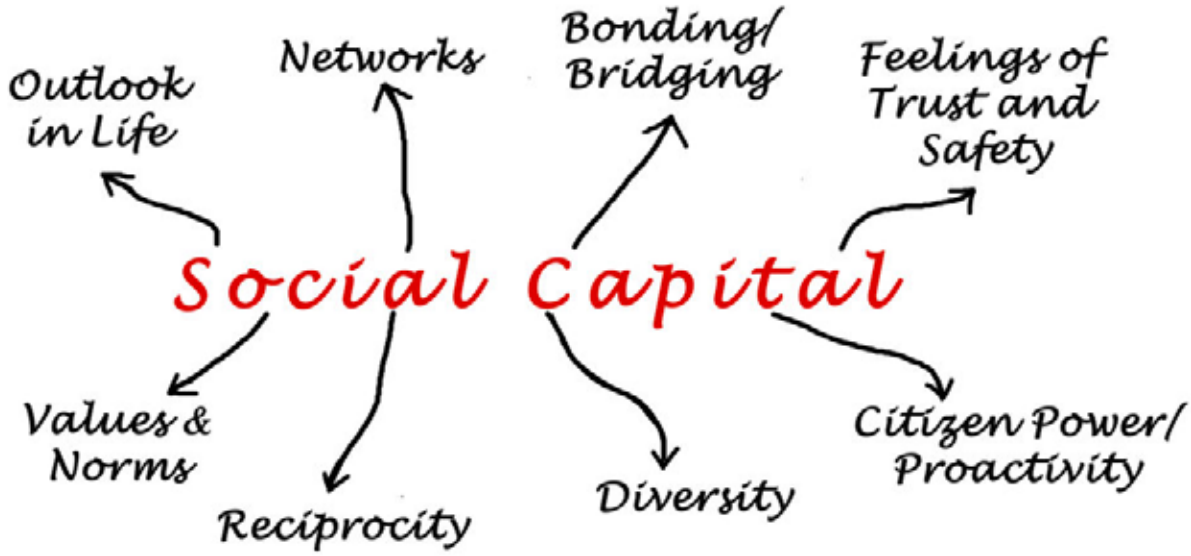
Unfortunately, as OSNs such as Facebook and LinkedIn continue to explode, group sizes have grown to such a degree that it is now difficult to discern who the key influencing individuals are versus the distracting "noise" coming from "opportunists."



As a result, splinter "micro" groups and other specialized OSNs have entered the market to super-segment and further categorize members. One nice thing about company-owned OSNs such as the Impetus InSite Platform® is that organizations can remain in complete control of the membership.

Social Capital

Social relationships are crucial in almost every work context and scenario. The resulting resources from these relationships are called "**social capital**." Reciprocity within these networks ensures that all individuals both share and receive benefits. Individuals who "**bridge**" social capital do so by connecting weak ties to others or to themselves for the



sole benefit of uncovering new information, new contacts, and diverse perspectives. On the other hand, those who "**bond**" social capital do so by connecting to close friends, family, and colleagues for the emotional and financial benefits they provide.

In work-related groups or customer advisory boards, bonding social capital implies that trust and a sense of obligation will encourage reciprocity, while bridging social capital helps facilitate access to non-redundant information and capital. Both are important for making progress and foster relationships. These formal and informal relationship constructs help individuals gain "**tribal**" knowledge that is often not formally recorded anywhere and helps create advocacy for people and projects. It is through the creation of social capital that we can find the success metric in utilizing OSNs in the work environment.

Procrastination and Productivity Loss

OSNs may be considered a time-waster by some, as they can often be used by employees to procrastinate on important work at hand. Forty-six percent of people reportedly play Candy Crush, Farm Heroes, or 8 Ball Pool on Facebook during work hours. Socializing and chatting on Facebook and browsing other sites such as Instagram and Pinterest can also be considered time wasters. There is currently no established association between **social capital building** and its intrinsic benefit in the work environment. The gap between **liking** someone's post on Facebook and its potential to build stronger collegial

relationships remains unbridged. Determining this, in turn, would improve work-related communication and collaboration. In the current corporate environment, OSNs can be considered a useful "rejuvenation" system for employees. Studies have shown that taking frequent and deliberate breaks can help employees stay focused, alert, and within ideal "flow states" for maximum creativity and productivity.

Privacy and Content Controls

With a few exceptions, users generally have complete control of what they input into their OSN profiles and who sees that information. Most OSNs, after much public debate and criticism, have become very transparent with their privacy policies and have increased the level of privacy controls that individuals can place on their profile information. For example, on Facebook, users can set up their profile, pictures, or posts so that only friends, and not the general public, can see them. LinkedIn allows users to view others' profiles anonymously or not have their profile updates appear on the general social feed. In addition, many OSNs allow users to preview post comments and timeline-adds from others before making them public.

With OSNs, there is always the danger of employees posting inappropriate or confidential information about themselves or the company they work for. This is further exacerbated if hierarchy, status, or power boundaries are crossed. As a result, many companies

have placed controls on who can represent their company on OSNs and have clearly defined the rules of OSN engagement.

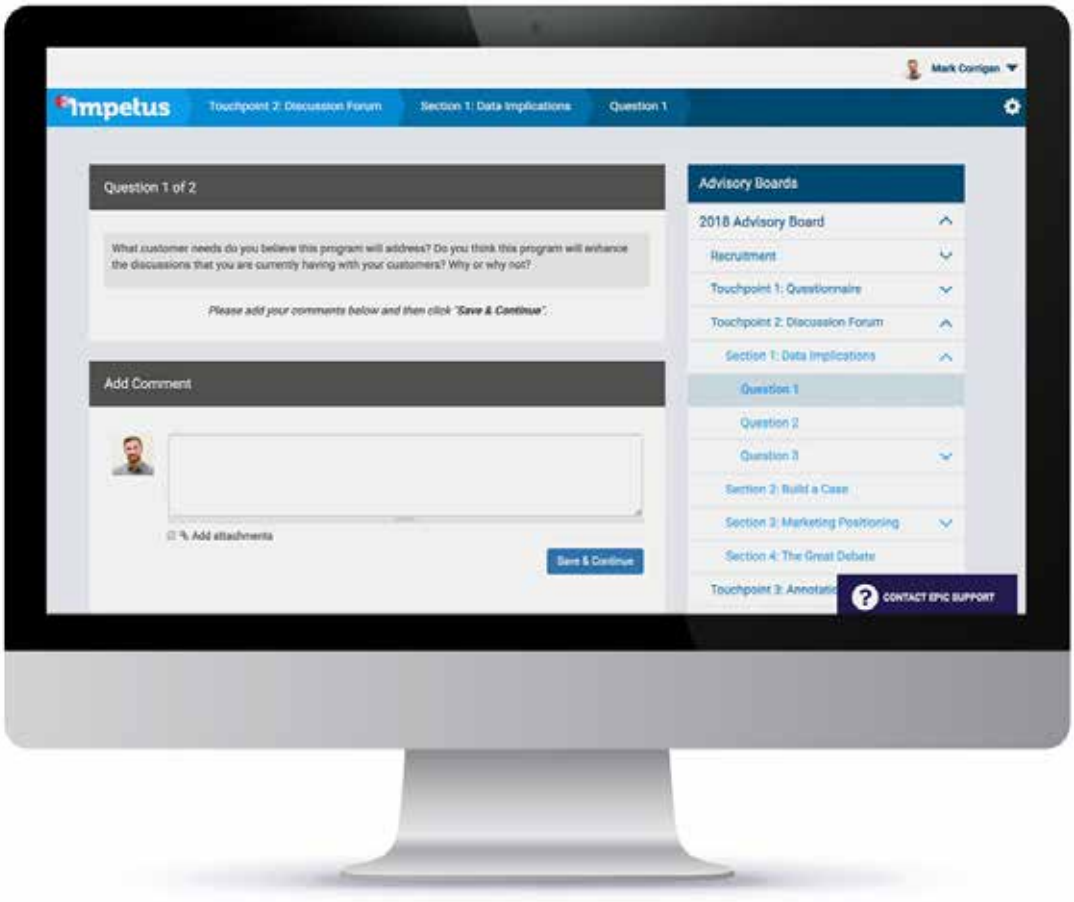
Specific Considerations for Pharmaceutical Companies

In the pharma space, due to extra compliance regulations, patient privacy concerns, and diligence required around adverse event reporting, extra attention to how OSNs are leveraged is needed. Previously, many pharma companies removed the ability for the public to post comments. In addition, most posts or responses from pharma were slow, heavily scripted, and riddled with legal jargon. The increased transparency and ability to nimbly navigate the rapidly expanding social universe has quickly made these practices obsolete. Today, pharma is broadening their guidelines about what can and cannot be said on OSNs to appear more approachable and accessible to the public. Employees are also asked to clearly disclose personal accounts on OSNs such as Facebook, LinkedIn, or Twitter to ensure clear delineation between them and their company accounts.

The Future of Online Social Networks in Pharma

OSNs have become a stomping ground for happy marketers. With the ability to profile ideal customer avatars, companies can create laser-targeted advertisement campaigns to generate new customers and to maintain relationships with current customers. In fact, through bonding and bridging social capital, these companies can leverage their loyal customer base for direct referrals and provide on-demand comment or video testimonials. OSNs also provide comprehensive fan pages and advertising analytics dashboards to help companies isolate the keywords, subject lines, content, and creative variables that bring in the most interest from their target group.

Marketing has never been easier or cheaper to administer. However, having said all that, companies are also the most vulnerable they have ever been. With the world of online transparency comes the risk of inviting public displays of naysayers, scathing criticisms, and "haters." Setting protocols for managing these types of comments and feedback on OSNs is a core mandate for marketing teams. In order to remain authentic, it is also important not to delete negative



Interactive Discussion Forums on the Impetus InSite Platform®

comments but rather reply to them in a transparent and honest manner.

Corporate-owned Private Portals

Consequently, many companies are navigating the creation of corporate-owned and branded private portals where only "invited" customers can log in. For example, the Impetus InSite Platform® allows regulatory, medical, scientific affairs, health economic, market access, and marketing teams to access physicians, investigators, allied healthcare providers, payers, administrators, patients, and other healthcare stakeholders through private, online discussion forums. These can come in the form of advisory boards or working groups. These small, exclusive membership groups allow users to share information and thoughts more freely and transparently. The asynchronous nature of the "call to action" activities within these online portals draw people in at their convenience. This removes the distracting element of on-demand email or synchronous platforms such as web meetings or chat forums, where instantaneous responses are often expected. Accordingly, private company portals can be a good option for organizations wanting to minimize their risks on larger public OSNs.

Part 2 — Applications of Digital Technologies for Pharma

CHAPTER 4 » THE NEXT BIG DEAL FOR BIG PHARMA IS... BIG DATA

As discussed in chapter 3, social media, despite its many flaws, represents a huge opportunity for pharma. But where does all the information that gets funnelled through our social media feeds actually get stored? And who is ever going to look at this stuff anyway?

These are important questions in light of the fact that we are living in a world moving at warp speed, where content is created, absorbed, and then deleted from our virtual screens within seconds. Facebook news feeds and LinkedIn group discussion content are refreshed at the blink of an eye. Photos on Instagram and Pinterest are replaced by cooler, catchier, and

> ***"Instead on relying on the human brain, which needs rest, variety, and diversions to keep it interested, we can leverage machines and complex algorithms to churn through massive databases on our behalf."***

sexier content each time we check our profiles. Content is fleeting and temporary at best.

Knowledge is as good as our neural networks are in absorbing the flashes of news that beam at us from every available digital nook and cranny. Our human brain capacity to curate, process, and store all of this information is limited by our finite levels of will power. Our will power can be easily depleted by exhaustion, stress, and boredom. Our brains, to keep the energy-efficient mechanism of automaticity in our thoughts and behaviors, will choose to "switch" off and rely on past memories to run our lives.

However, there is a gold mine of data swimming in the ocean of the "internet of things," often referred to as "big data," data mining, database knowledge discovery, data predictive analytics, or data science. Thank goodness for systems like Hadoop, which leverages MySQL as a structured query language to select and analyze data files based on specific conditions! Once big data are queried and refined, they can be analyzed with a number of tools such as R and Python. Instead on relying on the human brain, which needs rest, variety, and diversions to keep it interested, we can leverage machines and complex algorithms to churn through massive databases on our behalf.

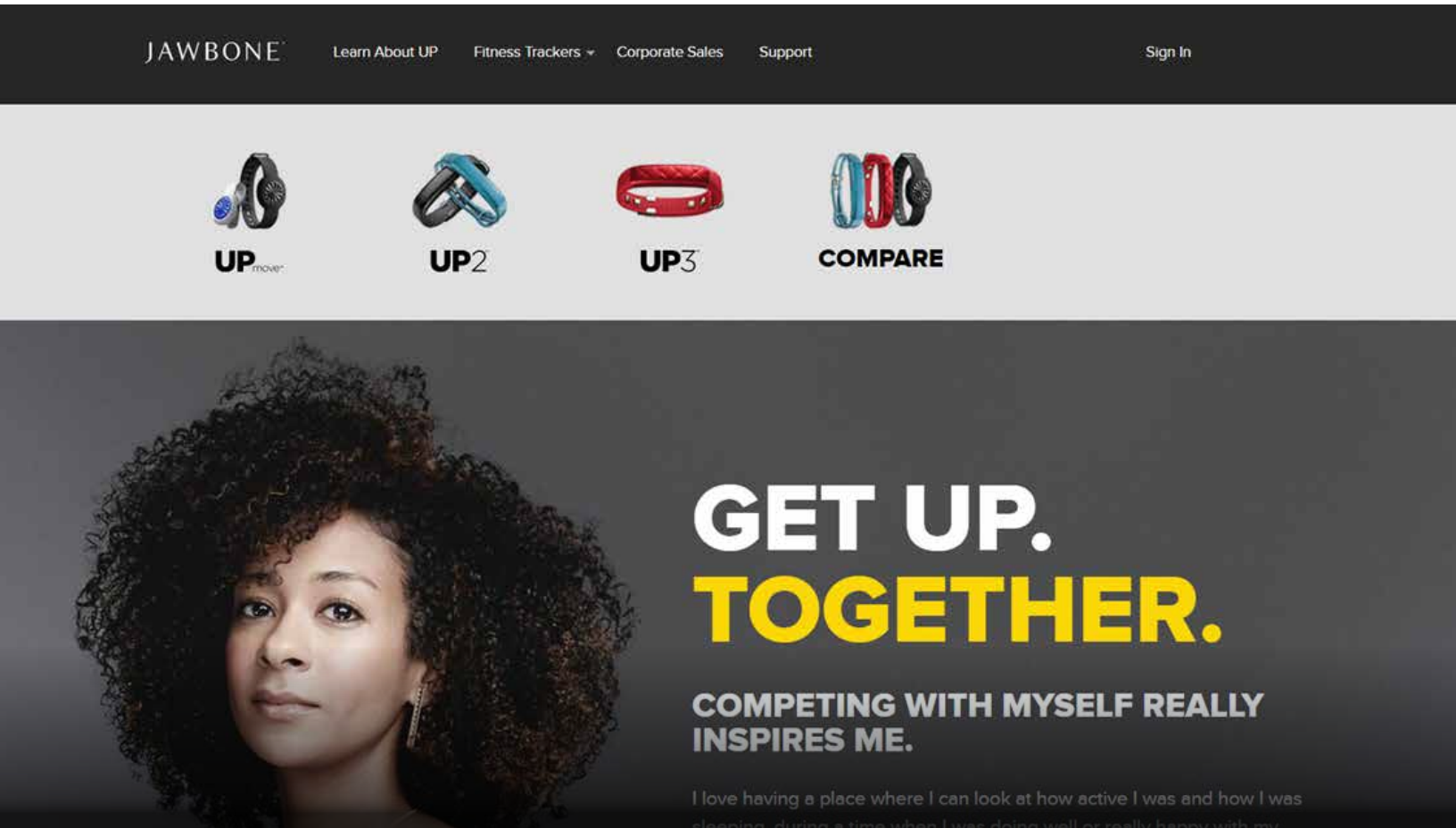
Social media database meccas such as Google, Facebook, LinkedIn, Yahoo, and Twitter all leverage their big data warehouses to help predict behaviors and build better tools for people to

use in order to make their lives better. Big data also promise huge potential benefits in genomics, clinical trial management, disease management, and patient medical intervention adherence protocols.

Behavior Prediction and Self Quantification

From a pure psychology standpoint, big data have begun to weigh in on areas such as wellness, mental health, depression, substance abuse, behavioral health, behavior change, and workplace well-being and effectiveness. With the rampant use of wearables and health trackers such as Fitbit, Jawbone, Oura, and the heart rate variability monitor Inner Balance, a new science revolving around the "quantified self" is emerging. The brilliance will be in linking the personal health data accumulated in these trackers to reveal population-based dynamic patterns in behaviors with specific outcomes. Once we start to understand these patterns and trends, we can start studying how specific interventions can impact these connections.

What is fascinating about our current blockchain world with knowledge abounding within the vasculature of the internet ecosystem, is that it has allowed data mining to occur with minimal cost and across multiple time



zones, cultures, and geographies. New partnerships and virtual relationships have developed as a result of this high level of visibility and accessibility. Fold in machine learning and "smart" computers with built-in AI algorithms, and you now have a technological environment that can read and predict individual behavior. We see this with home management systems like Nest and with chatbots like Amazon Echo and Google Home. With this, however, comes a huge responsibility of maintaining the security and privacy of individual information.

Big Data Analysis Systems

APIs

To simplify and declutter our lives, there has been increased emphasis on application programming interfaces, or APIs, to allow software applications to interconnect and "speak" to each other more readily. This is how capabilities can be consolidated and analytics dashboards can be centralized instead of being dispersed in multiple portals and platforms. To this end, we have seen a plethora of visual databases enter the market, including Airtable, Fieldbook, Microsoft BI, Domo, Tableau, InsightSquared, Chartio, and Looker, among others.

Web Scraping

Web scraping, an automated process where data can be extracted from backend websites to help populate centralized data warehouses or applications, has also been flooding the data market. Data scientists have utilized platforms such as CapturePoint, dexi.io, ReportMiner, Mozenda, and Monarch, just to name a few. Theory-driven methods have been used to ascribe meaning to the key components of the scraped data and allow for "junk" information that is not useful to be discarded. This can be fashioned to mining for diamonds and then tossing out the debris, which contains no value.

Singular Value Decomposition and Latent Dirichlet Allocation

Large databases, often referred to as "digital footprints" (found in Facebook and Twitter), when

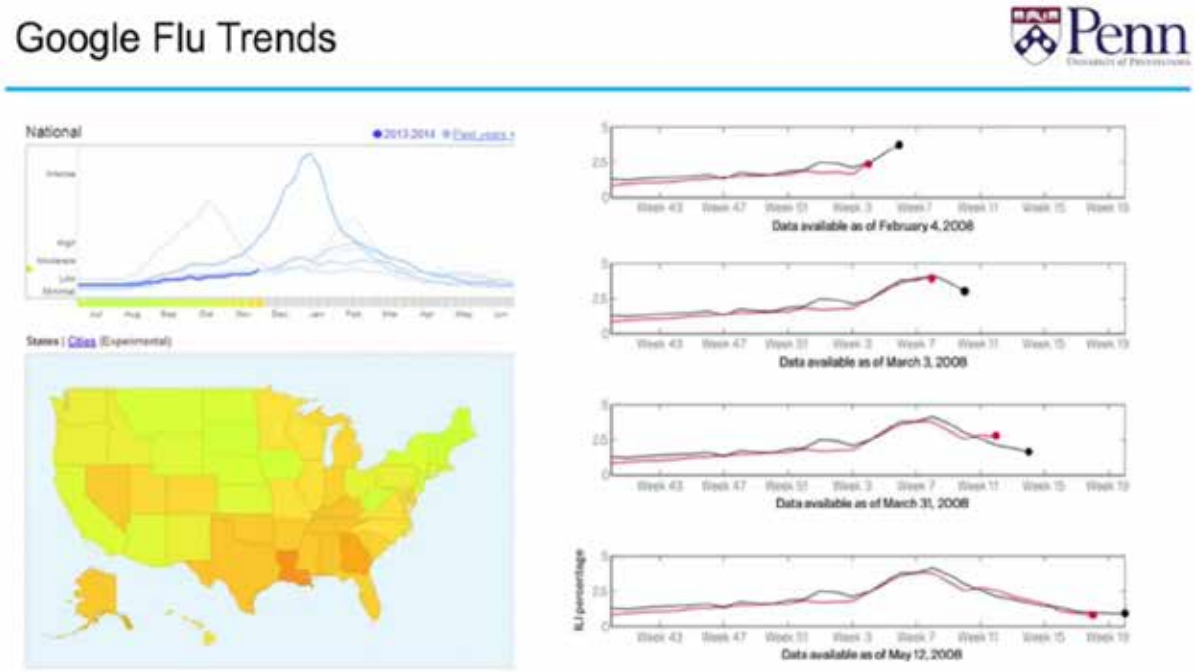
prediction

automaticity

genomics

analyzed to understand and predict relevant outcomes, can be excellent mining grounds for researchers and data scientists. They utilize procedures such as singular value decomposition to conduct principal components analyses, and latent dirichlet allocation (LDA) clustering procedures to help form dimensions with similar content. With LDA, heatmaps are used to show darker colors when a personality trait or characteristic is more correlated with an LDA cluster.

The usefulness of these methodologies was demonstrated in 2009. Google measured the occurrence of search queries related to the flu and then deduced how the flu would spread through the United States. They created a map and a time series that showed how the flu developed across the country through the seasons. Google's estimates were about two weeks ahead of the estimates from the leading medical authorities in the U.S., which track the incidents of flu with around 98% accuracy. This hence became a proof of concept that the internet and data flows could predict people's behaviors. Google realized that they no longer needed to check reports from the Centers for Disease Control and could now just observe data flows in order to capture the same information.



Differential Language Analysis and Regression Models

Other procedures, known as "differential language analysis," help reduce the large amount of text-based information found on the internet into smaller relevant dimensions so that they can be more effectively analyzed. Methods such as lasso (least absolute shrinkage and selection operator), k-fold cross-validation, and other regression models can help predict future outcomes. Unfortunately, these large database predictor models can derive erroneous conclusions when ecological and exception fallacies surface.

Linguistic Inquiry and Word Count

Researchers have also utilized "Linguistic Inquiry" and "Word Count" to analyze psychological themes by extracting regional and time-dependent events and testing for negative emotional responses. They try to reduce errors by identifying people who follow relevant community networks tied to specific geographical areas of the event and then compare these to more geographically dispersed control groups.

Predictive Word Tags

Others have utilized Twitter and Stack Overflow to analyze and predict tags that users would apply to their posts. By studying the nature, recency, and frequency of past user behaviors, and leveraging the tenet that "past behavior will predict future behavior," they are able to utilize random permutation models to understand and clarify predictions about links between processes and outcomes.

Data Decision Trees

Interesting approaches to organizing large datasets include structural equation model decision trees, which combine both data and theory-based approaches to testing hypotheses. Data scientists are able to test the accuracy of their data models by comparing variable importance, proximity, dissimilarity, and novelty metrics. There are also a series of machine learning and statistical learning theories that can be used to measure psychometric reliability of data sets, as well as the level of

correlation between multivariate data, as is seen with the analysis of genetic information.

Population Studies Using Social Media

With all of these fantastic advancements in big data number crunching and analysis, you may be wondering what "data" we are actually speaking about. We are not talking about data from typical clinical studies, which normally include a finite number of subjects, ranging between 50 to 3000 patients. With social media, researchers now have access to billions of people through platforms like Facebook, Twitter and the like. This is a huge opportunity from a scaling and statistics standpoint. This global data warehouse comprised of billions of social media users is the kind of data researchers are now navigating.

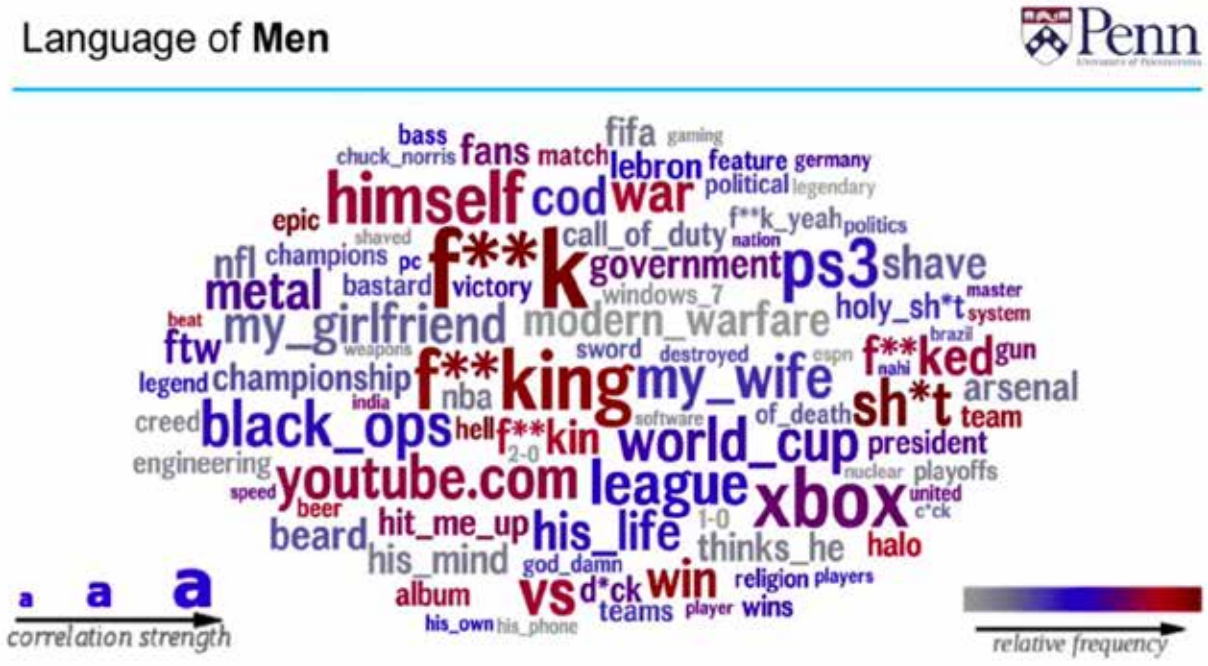
When data scientists began to incorporate social media listening into their research, they noticed that people behaved in different ways when they were not being actively "observed." That is to say, people will act more "freely" in their own environment and when left to their own devices. In addition, people only function within the spheres of "knowing what they know" and if asked a typical survey question, will respond in order to deliver a contrived notion of who they think they are or provide you with responses they think you would like to hear. Observing natural behaviors on social media is one of the "cleanest"

ways to capture the meaning between the lines.

A great example of "Linguistic Inquiry" and "Word Count" is a study that was conducted by the Positive Psychology Department at the University of Pennsylvania. The authors analyzed the words used by people on Facebook through their status updates and were able to count the number of times a specific word was used by a certain population. They then determined the percentage of times that specific word was used by those individuals. Subsequently, each word became a frequency statistic. By linking specific words and connecting them to specific personal statistics such as age, sex, and geography, correlations could be made. The study authors were able to tease out words that showed the strongest statistical correlation to the outcomes they were questioning.

As seen in the examples, word clouds were created to help people visualize the correlations. The size of the word encoded the "strength" of the correlation. The color encoded the "frequency," or the number of times that a word was used. By observing the following word clouds, one can see that the heart emoticon ("<3") is the single most predictive feature of being "female" on Facebook. It is highly predictive because it is both large (high correlation) and red (used frequently).

Compare this to the language of men. The first thing that jumps out at you is the curse words, which show signs of

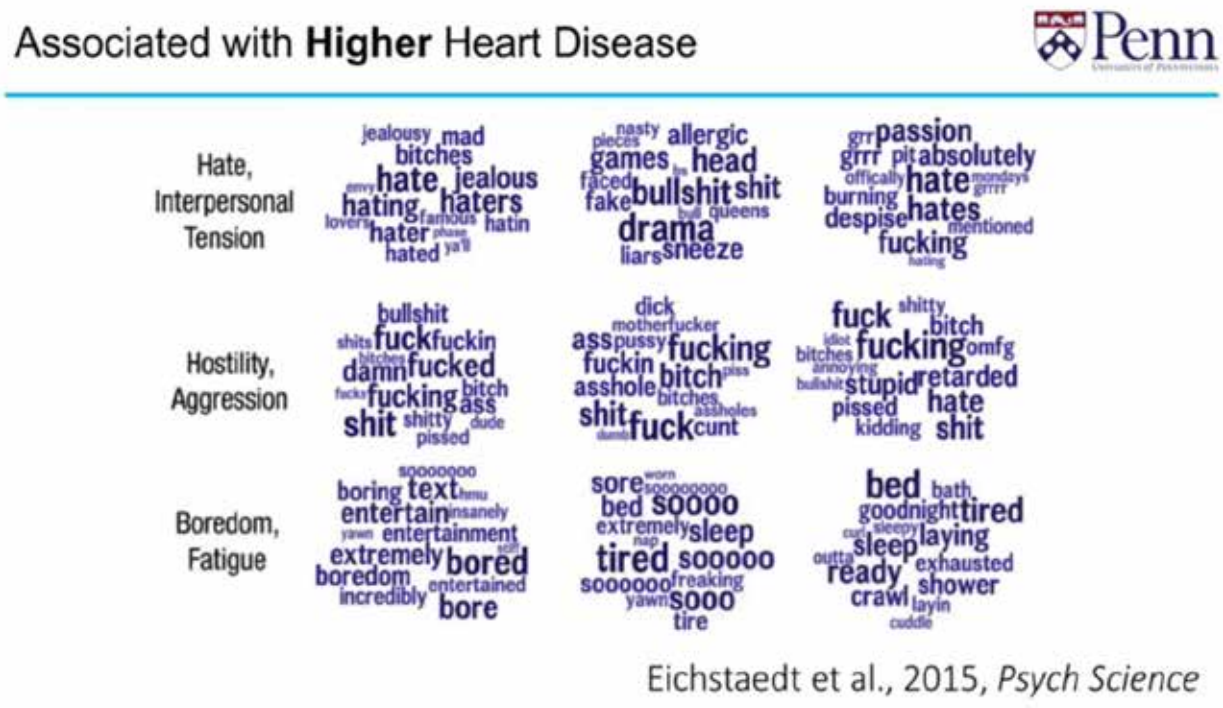


"disagreeableness" and the tendency to break away from social norms. It is also easy to see correlations to competition, with words related to video games and sports. Furthermore, words like "beard" and "shaving" are—unsurprisingly—more indicative of being male than female.

When analyzing extroversion, the single most predictive feature of being an extrovert is the word "party." Extroverts also have a tendency to use a lot of "bigrams" or phrases with two words. Missing apostrophes is also indicative of extroversion, because they usually show a lack of impulse control and the need for immediate attention and reward-seeking in social situations.

Introverts, on the other hand, commonly use words associated with seclusion and the use of technology such as "internet," "computer," "reading," and "Pokemon."

The same researchers moreover analyzed a billion tweets and correlated them with their country of origin. Further, they retrieved heart disease data from the Centers for Disease Control in the U.S., correlated the data with the Twitter words they had collected, and then created a word cloud that represented individuals who had heart disease. Among this population, words related to hate, hostility, aggression, cursing, disagreeableness, boredom, and fatigue were used most often.



What's interesting about all of this research is that the words or online "meta-tags" that we use in our day-to-day language can be very telling of who we are and the behaviors we will enact. Just like all big data analytics, the power lies in the predictive nature of these tools and eventually the ability to create interventions to intercede and prevent certain beliefs, perceptions, behaviors, and conditions.

The Promise of Big Data in Pharma

A comprehensive analysis of the data points that can emerge from clinical studies, retailers, patients, and caregivers can help manufacturers identify potential new drug candidates and develop them into effective, approved, and reimbursed medicines more efficiently. The race is on to create predictive models of biological processes and drugs without necessarily using patients. Patients can also be more readily identified and vetted for clinical trial inclusion using social media, with much less expense and time. Clinical trials can be monitored in real time, and safety or operational signals can be accelerated. Rigid data silos can be broken down and global data partnerships between manufacturers, academic researchers, CROs, providers, and payers can expedite innovation in a much more robust and time-efficient manner.

Further, as outlined in the University of Pennsylvania example above, patient, practitioner, and caregiver sentiments can be analyzed and mined to further understand the psychology of stakeholders with specific characteristics, conditions, or diseases. With that said, controls need to be created and diligently enforced to ensure that patient privacy and security are maintained at the highest levels.

Digital forums, such as the Impetus InSite Platform®, are great tools to facilitate IT-enabled portfolio decision-making. Moreover, such collaboration platforms can also be used to share and synthesize "big data" in the health arena, thus enabling manufacturers to respond to real-world outcomes and claims data. In turn, this will allow them to be better prepared to meet the demands of value-based pricing. Big data analytics promises to greatly improve drug safety, risk management, clinical trial efficiency, and patient adherence. The time is now for manufacturers to incorporate a data-centric approach by moving away from legacy technologies and disconnected data silos and to start investing in newer data-sharing and collaboration technologies.

Chapter 5 » Pharma Going Digital

IS DIGITAL HEALTH THE FUTURE?

In addition to the roles digital technologies play in our everyday lives and for data mining, the reliance on digital tools such as mobile devices/apps, wearables, virtual assistants, and AI in healthcare is quickly expanding. Pharmaceutical companies are increasingly integrating digital health into all services offered, including for treatment, follow-up, and prevention purposes. Additionally, they are shifting their focus from only providing drug-specific patient apps to developing more complex tools such as digital biomarkers to track various subjective or objective outcomes. As a result, digital health will likely play a major role in all aspects of healthcare

in the future. However, for digital health to reach its full potential, there are still obstacles to overcome. In this chapter, I explore some of the current and future uses of digital health and its benefits to both patients and pharma. Further, I discuss the challenges to address before these tools can become widespread.

Digital Health Today

Digital health tools serve multiple purposes. Basic health-related smartphone apps and wearables such as food diaries, exercise trackers, and heart rate monitors can help create awareness and improve general health. The ultimate hope is that these tools will minimize the risks of chronic lifestyle-related conditions such as diabetes and cardiovascular disease. However, public health efforts, for example delivered via digital communications, are needed to ensure that these apps reach their target audience.

Several targeted apps and sensors based on specific health conditions or treatments are also available. These include disease tracking, diagnostic, and medical-grade imaging

apps. Collectively, these are known as mobile health (mHealth) tools. In theory, mHealth can allow acute disease diagnosis and chronic disease management to take place outside the clinic or hospital. As examples, mHealth may include blood pressure monitoring, skin cancer screenings, and infectious disease diagnoses. With approximately 600 studies published on digital health apps, there is now clinical evidence supporting their efficacy.

Digital Health Tomorrow

Other growing areas of digital health include AI and the Internet of Medical Things (discussed in more detail in chapter 6). AI has shown some promise in diagnosing various cancers and interpreting imaging and diagnostic test results. Further, AI may also make medicine more specific by drawing distinctions easily missed by humans. For example, it may help promptly identify urgent vs. less urgent stroke cases and fast- vs. slow-growing cancers. In turn, this would enable high-risk patients to receive treatment more quickly. Although it will likely not be a substitute for human physicians, AI may greatly aid in establishing differential diagnoses and providing second opinions.

Benefits of Digital Health Tools

In addition to the potential benefits for improving human health and for preventing and managing diseases, there are multiple other benefits of digital health. For Pharma, digital health and AI can be leveraged throughout the lifetime of a patient's condition. This includes at pre-diagnosis, diagnosis, treatment, monitoring, and remission. By minimizing the need for clinic visits and expensive diagnostic tests at all these stages, digital health can help cut costs significantly. In fact, according to a recent report from the IQVIA Institute, the use of these apps in only five patient populations—diabetes prevention, diabetes, asthma, cardiac rehabilitation, and pulmonary rehabilitation—has the potential to save the U.S. healthcare system approximately $7 billion each year. Now, imagine if similar apps could be developed and implemented for all patient populations?

Moreover, by providing more targeted results based on various digitally-obtained biomarkers, digital health will also allow manufacturers to share the risk with the payers by pricing the products according to health outcomes. Consequently, such outcome-based pricing will allow the

“Outcome-based pricing will allow the prescription of the drugs most likely to provide a positive outcome for the patient.”

prescription of the drug(s) most likely to provide a positive outcome for the patient. In addition, by going digital, the price a healthcare system pays can be linked to the performance of the drug in real life.

Nevertheless, the pace of the digital revolution in healthcare has been slow, owing largely to the current regulations, or lack thereof, surrounding digital health.

Potential Barriers

Other barriers preventing the widespread use of AI in medicine include today's medical culture, which often values physician intuition over evidence-based solutions. Many physicians do not like being told what to do, especially by a computer. Hence, means of getting them comfortable with the idea of a machine observing their practice are needed. There are also financial barriers, especially in countries with a fee-for-service reimbursement model such as the U.S. In these cases, there is no financial incentive for practitioners to implement such a system.

Furthermore, despite the growing number of publications, high-quality large-scale research studies on digital health are still lacking. Especially, there is a huge unmet need for real-world, patient-generated data on

the efficacy of mHealth and AI. In addition, the technology must be easy to use for both the patients and providers, and the collected data must be easily interpreted.

There need to be extensive education and marketing efforts to make sure that the right patients or at-risk populations will use the relevant apps or devices. Even if the apps themselves work perfectly, if their target consumers do not use them, their effectiveness is limited. For example, getting overweight individuals, who may not be motivated to lose weight, to use fitness or diet apps represents an important challenge.

Finally, there are several ethical barriers to address. Digital health apps inevitably have to collect personal data. Ensuring the safety of those data is imperative. Especially, after the implementation of the General Data Protection Regulation (GDPR) in 2018, this should be a focus for all stakeholders. Further, another concern is that AI algorithms may be prone to bias. For example, the algorithms may inadvertently contain racial or socioeconomic biases if the management decisions are designed

to take into account the financial or insurance status of the patient.

Nevertheless, despite these potential barriers, in the next decade, most healthcare organizations and companies will likely use digital health tools to some degree. To achieve this goal, pharmaceutical companies need to continuously engage with external stakeholders to incorporate their needs and wants into the offered technologies.

Chapter 6 » Neurotechnology for Patient Care

Similar to the digital tools discussed in chapter 5, neuro-technology is another emergent field with increasing impact on patient care. However, unlike digital technologies such as wearables and mobile apps, neurotechnology refers to the use of technical tools enabling a **direct connection** between technical components and the nervous system. In other words, it refers to tools that (1) measure and analyze chemical and electrical signals and (2) interact with the nervous system. The aforementioned technical components include electrodes, computers, and neuroprostheses. Neurotechnology does not focus only on technology

itself, but rather on utilizing that technology to gain insight into the human nervous system. In particular, it aims to understand the nervous processes involved in various diseases.

Different types of Neurotechnologies for Patient Care

Neurotechnologies function in one of two main ways. They can be broadly divided into **recording devices** and **stimulators**. The former involves recording brain signals and translating them into technical control commands. This may be used to study and diagnose pathological conditions, or to control external devices (e.g. neuroprostheses). Conversely, the latter involves manipulating brain activity through various types of stimuli. The devices used can be either invasive or noninvasive.

Deep Brain Stimulation (DBS)

DBS is a common type of "stimulator." DBS electrodes are carefully inserted by a neurosurgeon into the relevant regions deep in the brain. Through interference with these targets, symptoms of specific brain diseases can be suppressed or reduced. That is, DBS applies weak electrical stimuli to activate or deactivate groups of cells or fibers within the brain. In turn, this helps alleviate symptoms caused by pathological nerve activity in that area.

Other Types of Electrical and Magnetic Brain Stimulations

Electrical and magnetic brain stimulations can influence brain activity via electrical impulses and magnetic fields, respectively. There are several types of electric brain stimulation. Among others, these include transcranial direct current stimulation (TDCS) and transcranial alternating current stimulation (TACS). TDCS is being used to improve performance and cognitive function. TACS may have implications for both improving memory and repairing brain damage. Indeed, there are some promising clinical trial results. However, the research is still in the early phase. Thus, these technologies are not yet ready for routine clinical use and should be used cautiously. Another promising type of stimulus is transcranial magnetic stimulation. This has shown some efficacy for treating depression.

Real-time Neuromonitoring

Systems actively monitoring brain activity and responding in real-time

with appropriate actions are being developed. For example, these systems can detect symptoms suggesting an oncoming brain event (e.g. a seizure) and provide preemptive treatments to minimize or avoid the event. Some monitoring systems can be coupled with robotic aids to enable patients suffering from neurological disorders to regain lost motor control.

Big Data-enhanced Diagnostics and Treatments

In today's digital world, brain health systems can leverage measurements from broader and broader populations. Analyzing these data can help understand exactly where an individual's readings lie on the health-to-disease distribution curve. Using big data will also allow improved understanding of how an individual's readings change over time. In turn, this will enable better diagnoses and treatments based on the treatment efficacies in other patients with similar brain signatures.

Brain-Computer Interfaces (BCIs)

BCIs acquire, analyze, and translate brain signals into commands. Subsequently, these commands are relayed to output devices that carry out the desired actions. The main goal of BCI technology is to improve function in people disabled by neuromuscular disorders.

Virtual-reality Treatments

Virtual-reality treatments are becoming increasingly used for several purposes. These include exposure therapy and post-traumatic stress disorder treatments. Further, virtual reality can be used for surgical planning and assisting surgeons in the operating room.

Wearables

Wearables, including commercially available ones such as Fitbit and Apple Watch, are being increasingly used to improve both physical and mental health. For example, activity and heart rate data can be collected and analyzed. Individualized training programs can be designed to improve physical health. Further, meditation and other mindfulness apps can be added to improve mental well-being.

Internet of Medical Things (IoMT)

The IoMT (also known as the "Healthcare IoT" or "Pharma IoT")

> ***"An important utility of the Internet of Medical Things (IoMT) includes remote monitoring of patients with chronic diseases."***

is a collection of medical devices and applications connected to IT systems through online networks. It was created as an effort to "move beyond the pill." The IoMT involves digitalization of products and the related care processes using smart connected medical devices and IT services. This includes during all stages of therapy/drug development, clinical trials, and patient care. In brief, medical devices are equipped with Wi-Fi to allow machine-to-machine communication. These devices link to cloud platforms where the data are stored and analyzed.

As part of patient care, the IoMT can help monitor and promptly notify caregivers and healthcare providers regarding potential issues. In turn, this allows for earlier intervention. An important utility of the IoMT includes remote monitoring of patients with chronic diseases. This is also known as "telemedicine" and saves patients from visiting a clinic or hospital every time they experience a change in condition. For example, IoMT solutions include wearable sensors for medication management in Parkinson's disease or MS patients. Furthermore, tracking of medication adherence and the real-time location of patients are other current examples. Patients can also use IoMT devices and IoMT-connected smartphone apps to remind them about appointments and alert them about changes in blood pressure or glucose levels.

Finally, existing medical devices such as inhalers or insulin pumps can be added to the neurotechnologies used

as part of the IoMT. This allows the collection of data for further analyses. Consequently, these patient care data provide new sources of innovation, facilitating the development of personalized therapy. However, there are also countless other potential applications in the neurotechnology space.

Current Applications of Neurotechnology for Patient Care

Currently, neurotechnology is used for multiple purposes. These include both assessments and interventions for various conditions. Presently used assessments include neuroimaging techniques such as functional magnetic resonance imaging (fMRI) and electroencephalography. Interventions include brain implants, BCI technologies, and electric/magnetic brain stimulations, among others. Some tools may play roles in both assessment and treatment. For example, real-time fMRI can be used to both image the neurobiology of a disease state and to provide neurofeedback-based rehabilitation.

BCI devices are used clinically to assist in the rehabilitation of patients with stroke, paralysis, and degenerative conditions. Moreover, DBS is regularly used in patients with Parkinson's disease in whom medication is ineffective. Other uses include symptom-relief in patients

with epilepsy and Tourette syndrome. Although DBS cannot cure neurodegenerative processes, it can alleviate severe symptoms such as tremor or rigor, thereby improving the patient's quality of life. Neurotechnology can also be used to assess, treat, and study the complex socioemotional processes underlying various psychopathologies. Accordingly, DBS is also showing promise for the treatment of psychiatric disorders such as obsessive-compulsive disorder, depression, and addiction.

Future Applications

Neurotechnology is currently being assessed in several, albeit small, clinical trials. The potential uses of this technology are countless. Among others, using brain waves to control robotic limbs (i.e. neuroprostheses) is an emerging area of study. For obvious reasons, this application has many people very excited. Indeed, there are some promising results from small-scale clinical trials. The same type of implantable neurotechnologies also shows promise for the diagnosis of various neurological diseases, including epilepsy.

The role of BCIs in stroke rehabilitation is expected to increase in the future. This technology may also be used to augment the performance of surgeons or other medical professionals. Accordingly, BCI technology is a rapidly growing research area. Further, within the next 10 years, neurotechnologies will likely play a major role in the treatment of mental illnesses, complementing pharmacological and psychosocial therapies. In the mental health field, neurotechnologies may also help conduct evidence-based evaluations. This is especially important since effective assessment tools are still lacking for many disorders.

Current Barriers to Widespread Neurotechnology Use

Nevertheless, there are multiple challenges to overcome before neurotechnology will be routinely used clinically. Each specific technology faces its own barriers. For example, in terms of BCIs, several challenges exist. These include the need for signal-acquisition hardware that is convenient, portable, safe, and able to function in all environments. Second, real-world data validating the utility of BCI for the

treatment and rehabilitation of stroke and other conditions must be collected and analyzed. Third, there need to be effective models for the widespread dissemination of BCIs. Lastly, the BCI performance and reliability must be further improved.

Furthermore, for the IoMT to reach its full potential, companies will need to determine how to turn all the collected data into insights and, eventually, actions. This will require administrators, manufacturers, and vendors to work together. Finally, although many IoMT-connected devices now have sensors for collecting data, they often communicate with the server in their own "language." That is, as each manufacturer has their own proprietary protocol, sensors developed by different manufacturers or used at different centers cannot always communicate with each other. In turn, these barriers may undermine the whole IoT concept.

Ethical Issues

In addition to technological barriers, there are also several ethical issues to consider. With the increased use of IoMT technologies and collection of personal data, novel issues around data privacy and safety are likely to arise. In particular, pharmaceutical

companies need to consider the recently implemented GDPR legislation when collecting patient data.

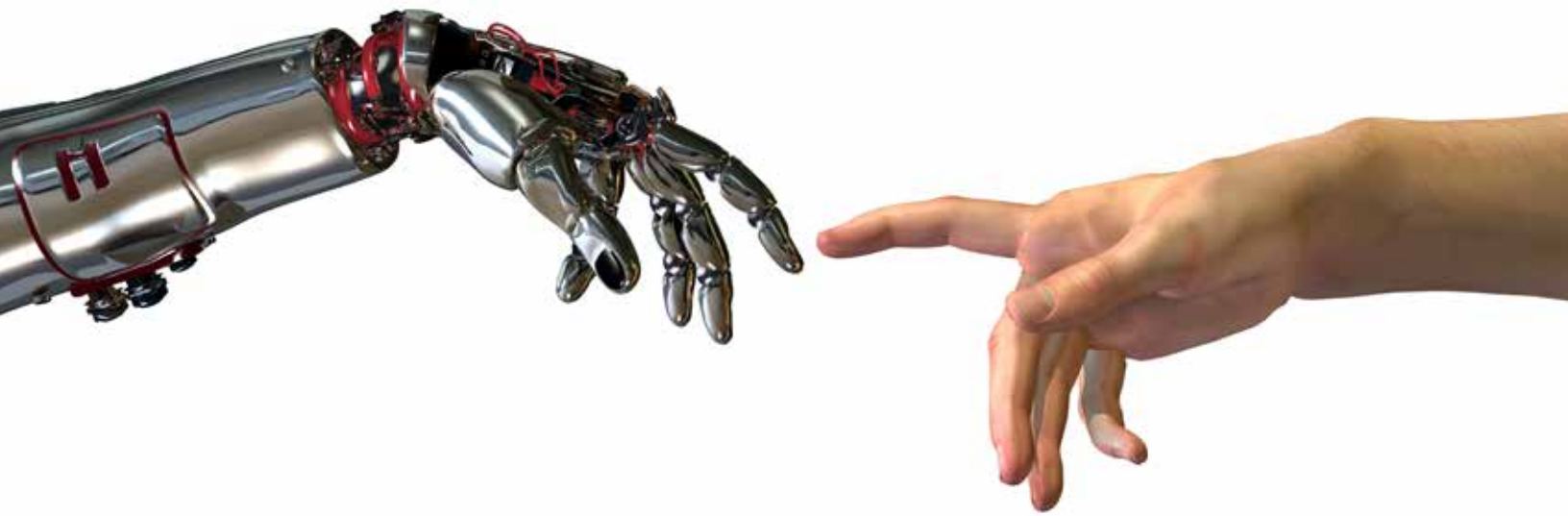
Ensuring secure data systems and neurotechnologies are of utmost importance. "Neurohacking" is one potential issue that must be dealt with before this technology becomes widespread. As an example, if connected to an IT system, a patient's insulin pump could be hacked and the dose could be changed without the patient even being aware. In the future, neuroprostheses may contain wireless components that could be hacked, also resulting in potentially lethal outcomes.

Other ethical issues related to data security include how to handle an individual's neurological information collected through these technologies. Should the authorities be informed if certain neural correlates of behavioral traits (for example, psychopathy, pedophilic arousal etc.) are discovered during neuroscans? If an individual is

convicted of a certain crime, could or should they refer to their neuroscan results to claim innocence? How will these data be handled in criminal courts?

Finally, the potential for altered personality or 'dehumanization' is one of the major and most difficult challenges to address. There have been some cases of patients experiencing unfamiliar character traits or new behavioral patterns after invasive brain stimulation. While most such cases are subtle, they may also be quite severe. For example, there have been reports of rare cases of new-onset depressive disorder, disproportionate euphoria, or increased risk-taking behavior post-DBS. In the more distant future, the emerging neurotechnologies may also call into question the concept of what it means to be "human." Will our perception of ourselves change when wired to, or even controlled by, machines?

Whether technological or ethical in nature, it is clear that there are many obstacles to overcome before neurotechnology becomes part of standard patient care. More than anything, we need clear guidelines and regulations for every aspect of the process. In turn, this will require the cooperation of multiple stakeholders, as well as ongoing communication among all parties. Expert insights on how to best design, test, implement, market, and monitor neurotechnologies are invaluable for this purpose.



Chapter 7 » Behavioral Science in Pharma

Wrapping up our discussions on the many uses—both current and future—of digital technologies and collaboration in our everyday lives and for pharma specifically, I wanted to touch upon the importance of behavioral science. To stay relevant, pharma and healthcare companies need to move beyond the pill. Instead, the focus needs to shift to the broader patient journey. This includes changes in the way companies communicate with patients. One essential means of achieving this goal is the application of behavioral science to all aspects of drug development, marketing, and medical education.

All health decisions are, to some extent, determined by human behavior. Behavioral science, the study of animal and human behaviors, encompasses various disciplines. Among others, these include sociology, psychology, and social and cultural anthropology. By understanding the science of the mind and its processes, and incorporating those principles, more effective, result-orientated communications can be developed. In theory, by routinely incorporating both behavioral science and digital technologies, pharma could drastically improve the health journey of their patients.

Behavioral Science in Drug Marketing

Getting a patient to change their behavior related to the treatment of their disease can be frustrating, if not near-impossible. In this regard, behavioral science can be used to offer important insights to develop novel marketing approaches.

Behavioral change interventions, including the digital and neurotechnology tools discussed in chapters 5 and 6, are often ignored by the people who need them the most. This can be either due to physical or emotional barriers, such as travel difficulties or poor self-esteem, respectively. Currently, many pharma marketing programs, unfortunately, rely on an overly simplistic understanding of human behavior. In turn, this may result in an inadequate or unsuccessful campaign for encouraging the ideal health behaviors. By incorporating behavioral science into pharmaceutical marketing, the resulting techniques cannot only bring commercial advantages but also make a real difference in the patients' lives.

In more detail, using behavioral science for planning a marketing strategy ("behavioral marketing") can help in several aspects. It can:

- Provide validated models for understanding human behavior
- Reveal how non-rational impulses influence decision-making
- Provide a conceptual basis for insights that may be the difference between an average vs. high-impact campaign
- Allow for a highly targeted approach and lead to an extremely high level of customer engagement
- Measure the impact of a marketing campaign, followed by offering potential improvements to the strategy

sociology

psychology

anthropology

Importance of 'Purpose' for Behavioral Marketing

It is crucial to understand what your brand's purpose is relative to the desired shifts in health behavior. For example, it may be difficult for a brand that treats a specific condition to authentically state that its purpose is to eliminate that condition through lifestyle changes, as this would ultimately put the brand out of business. This is one reason why many pharma-sponsored behavioral change programs fail to truly connect with the consumers. The desired behavior change must align with the brand's purpose. Often, a clearly articulated purpose with regard to consumer health is lacking. Hence, clarifying this purpose is critical.

Additionally, one or more models of behavioral change, applicable to the condition or disease state in question, should be identified and applied. The most common issues facing individuals participating in the program should be elucidated. Finally, the patients' experiences with their condition should be considered in the context of their life, not their life within the context of their condition. This helps illustrate how both the condition itself and other elements of the person's life have changed.

Behavioral Marketing in the Digital Age

While the concept of behavioral marketing has been around for a long time, the recent technological and digital advances discussed in previous chapters have allowed the industry to connect with patients on a more individual level. While evidence-based data will always be essential, knowing how to extract and utilize the most important information is becoming increasingly important. In behavioral marketing, the key is to figure out who the target audience is, what the patients want, and in what way (how) they want it.

To this end, conducting a **customer segmentation analysis** is key. Once the potential patient populations are identified, these patients can be targeted to assess additional behavioral attributes or commonalities. Digitally, this can be done through cookie tracking or through building a **customer relationship management** ("CRM") stream and analyzing data segments.

Behavioral science-based technology and apps can also be used to continuously monitor and track the effectiveness of a campaign; this is crucial for ensuring its success. In addition, by using digital tools, clear goal setting

and positive reinforcement can be used to motivate the patients to change their health behaviors.

Behavioral Science in Medical Education

Despite the enormous potential benefit to patient care, the application of behavioral science to medical education currently lags behind that in other healthcare areas. The low adoption rate is mainly due to the mixed understanding of, and lack of consistency in, the techniques employed. In addition, there is a perception that behavioral science is only relevant to certain roles and activities. Hence, while medical education is regarded as a key area for the application of behavioral science, medical affairs currently has limited involvement in its application.

To address this knowledge gap, medical affairs professionals must become more engaged in behavioral science approaches. By gaining a better understanding of how these approaches can be applied, in an ethical and compliant way, to medical education, a positive behavior change among healthcare professionals can be achieved. Thus, medical affairs teams have the opportunity to lead the ethical application of behavioral science to improve the effectiveness of medical communications and education.

> *"There are often cultural differences dictating the kind of message to deliver."*

Understanding Human Behavior Could Improve Drug Adherence

Non-adherence and non-compliance to drugs are well-established issues, with up to 75% of patients not taking their medications as directed. Further, many patients will stop treatment prematurely. The implications of non-adherence are far-reaching, costing healthcare systems worldwide billions of dollars annually. To date, no universal solution has been proposed. However, behavioral psychology, which focuses on people's actions, emotions, and thoughts, is now being explored by some pharma companies as a potential solution.

Patients' motivation to start and continue with a prescribed medication is influenced by how they judge their personal need for the medication vs. concerns about potential adverse effects ("necessity beliefs"). Behavioral psychology uses the **three C's** of behavioral change: **C**hannel, **C**ontent, and **C**ontext. First, the appropriate **channel** for supporting the patient is identified, whether a digital app, nurse, doctor, or other healthcare worker. Next, the **content** is designed based on the above necessity beliefs, tailored to the chosen channel. Finally, the **context** must be considered, as there are often cultural differences dictating the kind of message to deliver and the appropriate patients to deliver it to.

So Why has Pharma Been So Slow to Adopt Behavioral Science?

Surveys have revealed that the vast majority of healthcare workers consider behavioral science to be important to future healthcare. However, numerous issues remain to be solved before its use will become

more widespread. Among many others, these include:

- Identifying the best ways to gain and retain engagement of the target audience
- Understanding that observing patient behavior is not an exact science and that the results can be easily misinterpreted
- Privacy concerns
- Lack of relevant skills
- Cultural differences in the attitudes towards the credibility of hard vs. soft sciences (with behavioral science belonging to the latter)
- A lack of internal buy-in
- How to best address the perception that behavioral science is used by marketers to "manipulate" customers and is therefore inappropriate in a clinical or scientific setting

What Can Be Done to Facilitate the Adoption of Behavioral Science?

To support the adoption of behavioral science by pharma, the concepts and benefits must be expressed in a language that resonates with the intended audience. Further, it must be backed up by evidence to demonstrate its effectiveness in healthcare. Research has shown that when the right language is used in education programs, behavioral changes and more rapid adoption of evidence-based medical practice will ensue. This will be key to gaining internal buy-in. Expert partners with real-life experience of applying behavioral science principles are needed both to champion the approach and for supporting skills development within the industry.

Moreover, when applying behavioral science to practice, it is important that everything that may affect behavior is considered. If your findings are inconsistent with what was expected, you have to ask yourself why someone would behave a certain way in that particular situation. Similarly, it is also important not to make generalizations and project your expectations; remember that all people are unique. For this reason, careful planning, detailed protocols, and large sample sizes are important when designing a trial.

In terms of privacy concerns, especially in light of the recent implementation of the GDPR, the company or industry policies should always be followed. However, this may sometime present a challenge. To overcome this obstacle, working with, and gaining

insights from, the appropriate experts is essential.

Conclusion

To develop meaningful communications, a better understanding of the complex systems that inform attitudes, beliefs, and behaviors is needed. While clinical evidence is critical, it is not sufficient to resonate with the target audience. To achieve this, marketing and education efforts must also take into account people's values and preferences. With this insight, communications can be tailored to ensure that clinical evidence is translated into practice and that the patients will benefit.

Further, for the successful integration of behavioral science, it should be routinely used on a daily basis, across all activities, big or small. That is, it should not be considered as a separate specialist discipline per se. At the end of the day, it is an essential foundation for all communication regarding health decisions.

The theories and application of behavioral science can seem complicated and daunting at first. However, with a little help from the appropriate experts, it is possible for pharma to cut through this complexity and successfully incorporate the fundamental principles into their practice.

Chapter 8 » Key Takeaways

AND HOW IMPETUS DIGITAL CAN HELP

It is evident that in order to optimize patient health, as well as the healthcare system as a whole, digital technologies will continue to play increasingly important roles. However, these should not be used in isolation, but rather be incorporated into a larger toolkit comprising a combination of digital and traditional tools. Especially, inclusion of behavioral science and other psychology tools, as well as analysis of big data obtained from a variety of sources, will be key to ensuring the success of many (if not all) pharma-led initiatives and projects.

No matter if a company is looking for advice on how to best leverage big data or how to overcome the barriers to widespread neurotechnology use, expert insight is needed at each step of the way. Ideally, to

The typical results obtained using the Impetus InSite Platform® speak for themselves...

+30%	+40%	+50%	−75%
Engagement rates, guaranteeing an average of 90%	Speed to insight gathering and project completions	Quantity and quality of advisor insights gathered	Costs compared to in-person consultancy meetings

gain a steady stream of high-quality insights, ongoing relationships with key opinion leaders should be established. However, organizing face-to-face meetings is often associated with numerous logistic issues, as well as high costs. In particular, getting a dozen advisors, who often reside in different provinces or states (or even countries), together for an in-person meeting at a specific time and place, is a challenge, given their busy schedules and conflicting commitments. In addition, organizing transportation, accommodation, a physical venue, and food for live meetings is costly, which is why most companies aim for yearly advisory board meetings, if that. These infrequent interactions make it difficult to establish ongoing and meaningful relationships with the advisors.

As mentioned in previous chapters, one effective way to circumvent this is to conduct online advisory boards using digital platforms such as the Impetus InSite Platform®. This allows the advisors to provide feedback when convenient, at the time(s) and place that suit them best. Several digital advisory boards can be conducted over a specified period, each customized to build on the insights obtained in the previous. If needed, web-based or in-person meetings can be organized at critical points of the process. Using a digital system also helps minimize the administrative burden by automating project elements such as email reminders and collation of

responses into transcript reports. The online format is ideal for gathering timely and expert advice on a variety of topics, including on how to best navigate the complicated processes surrounding digital and neurotechnologies for patient care. Moreover, the platform can be used to co-create and edit documents such as study protocols, research papers, regulatory dossiers, educational materials, and marketing materials with the advisors.

The advisors can include physicians, nurses, pharmacists, allied healthcare providers, researchers, payers, and patients, among others. The enrolled advisors can be engaged through a series of online touchpoints either in the form of web meetings or online asynchronous assignments delivered as web form questions, discussion forums, annotation and selection exercises, debates, or case studies.

The virtual nature of the boards and working groups can help increase the engagement rates of the advisors, who are often extremely busy and utilized by multiple manufacturers for similar purposes. Moreover, the assignments, which are compelling, relevant, and timely, can give the advisors or team members time to pause, reflect, process, and review their colleagues' comments on their own time. In turn, this allows for more thoughtful and granular insights shared through the online forums. Impetus creates, programs, project-manages, and reports all activities. Accordingly, the manufacturer's workload is minimal and so are the costs when compared to more traditional in-person consultancy meetings.

Here's what

SOME OF IMPETUS' CLIENTS AND THEIR ADVISORS HAVE HAD TO SAY ABOUT THE IMPETUS INSITE PLATFORM®

"The platform worked very well! It was a great user interface, we need more well designed technology in health!"

- Gastroenterologist Advisor

"This has been a unique and innovative opportunity. Being able to view the comments from my colleagues has been really cool. It gives you an insight to different practice standards. It helped me improve my practice in certain areas too."

- Physician Advisor, Long Acting Therapies

"I am so happy that all the physiotherapists were given an opportunity to participate in this process, rather than relying on a few select individuals. The more input you get, the easier it will be to develop something that is actually useful!"

- Physiotherapist Advisor

"This is the 2nd annual project we have worked on with Impetus and each year it gets better and better. We are hoping to continue to work with Impetus in 2019 on the same initiative."

- Client Representative

"I would be happy to participate in more online engagements as it's helpful for me (and I hope also to [Client]). Realistically this is the best way to get multiple advisers to participate as it allows flexibility in scheduling."

- CNS Advisor

"Our HCPs really enjoy using the portal to respond to discussion—it is easy to use and they really appreciate being able to complete the activity at their own pace. Impetus also did a great job of working with the advisors to get us 100% completion by the group."

- Client Representative

"Thank you for asking what we think as specialists. If the feedback is much negative, it can prevent bothering many colleagues with a tool not so useful for us."

- Physician Advisor, Respiratory Disease

"I think this asynchronous online activity was awesome, very well received by the docs. Kudos to the Impetus team for putting it together!"

- Client Representative

Recent Customer Success Stories

IMPETUS HAS PROVEN SUCCESS IN IMPROVING OUTCOMES FOR THEIR CLIENTS' CUSTOMER ADVISORY BOARDS AND WORKING GROUPS. SEE FOR YOURSELF IN THE CUSTOMER SUCCESS STORIES BELOW!

CLICK TO VIEW

References

Aksulu, A., Wade, M. (2010). A comprehensive review and synthesis of open source research. Journal of the Association for Information Systems, 11, 576–656.

Albors, J., Ramos, J.C., Hervas, J.C. (2008). New learning network paradigms: Communities of objectives, crowd-sourcing, wikis, and open source. International Journal of Information Management, 28, 194–202.

Ali-Hassan, H., Nevo, D., Nevo, S. (2010). Mobile collaboration: Exploring the role of social capital. The DATA BASE for Advances in Information Systems, 41, 9–24.

Allen, D., Wilson, T.D. (2003). Information overload: context and causes. The New Review of Information Behaviour Research, 4, 31–44.

Allen, D.K., Shoard, M. (2005). Spreading the load: mobile information and communication technologies and their effect on information overload. Information Research, 10, paper 227. Retrieved from http://www.informationr.net/ir/10-2/paper227.html

Alvarez, R.M. (2016). Computational social science: Discovery and prediction. Cambridge, UK: Cambridge University Press. Retrieved from http://dx.doi.org/10.1017/CBO9781316257340

Armstrong, H., Padilla, N. (2017). Digital Health: A new path to success. Deep Dive. Retrieved from https://pharmaphorum.com/deep-dive-digital-II-december-2017/index.htm#!/digital-health-a-new-path-to-success

Author unknown. (2018). From A&E to AI - Artificial intelligence will improve medical treatments. The Economist. Retrieved from https://www.economist.com/science-and-technology/2018/06/07/artificial-intelligence-will-improve-medical-treatments

Avital, M., Te'eni, D. (2009). From generative fit to generative capacity: Exploring an emerging dimension of information systems design and task performance. Information Systems Journal, 19, 345–367.

Back, M.D., Stopfer, J.M., Vazire, S., Gaddis, S., Schmukle, S.C., Egloff, B., Gosling, S.D. (2010). Facebook profiles reflect actual personality, not self-idealization. Psychological Science, 21, 372–374.

Beaton, D., Dunlop, J., Abdi, H. (2016). Partial least squares correspondence analysis: A framework to simultaneously analyze behavioral and genetic data. Psychological Methods, 21, 621–651.

Binder, J., Howes, A., Sutcliffe, A. (2009). The problem of conflicting social spheres: Effects of network structure on experienced tension in social network sites. Proceedings of the 27th International conference on human factors in computing system, Boston, MA.

Bohnert, D., Ross, W.H. (2010). The influence of social networking web sites on the evaluation of job candidates. Cyberpsychology, Behavior, and Social Networking, 13, 341–347.

Brandmaier, A.M., Prindle, J.J., McArdle, J.J., Lindenberger, U. (2016). Theory-guided exploration with structural equation model forests. Psychological Methods, 21, 566–582.

Buhrmester, M.D., Kwang, T., Gosling, S.D. (2011). Amazon's Mechanical Turk: A new source of cheap, yet high-quality, data? Perspectives on Psychological Science, 6, 3–5.

Chapman, B.P., Weiss, A., Duberstein, P. (2016). Statistical learning theory for high dimensional prediction: Application to criterion-keyed scale development. Psychological Methods, 21, 603–620.

Chen, E.E., Wojcik, S.P. (2016). A practical guide to big data research in psychology. Psychological Methods, 21, 458–474.

Cheung, M.W.L., Jak, S. (2016). Analyzing Big Data in Psychology: A Split/Analyze/Meta-Analyze Approach. Frontiers in Psychology, 7, 738.

Chouffani, R. (2014). Can we expect the Internet of Things in healthcare? Retrieved from https://internetofthingsagenda.techtarget.com/feature/Can-we-expect-the-Internet-of-Things-in-healthcare

COUCH MEDCOMMS. (2017). What marketers can learn from pharma behavioural science. Retrieved from http://www.wearecouch.com/blog/what-marketers-can-learn-from-pharma-behavioural-science

Cutler, K.M. (2010). Yammer, the Twitter for businesses, crosses 1 million users. Retrieved from http://venturebeat.com/2010/07/20/yammer-1-million-users/

Dabbish, L., Kraut, R. (2006). Email overload at work: An analysis of factors associated with Email Strain. Proceedings of the 2006 Conference

on Computer-Supported Cooperative Work.

Dennis, A.R., Rennecker, J.A., Hansen, S. (2010). Invisible whispering: Restructuring collaborative decision making with instant messaging. Decision Sciences, 41, 845–886.

De Reuver, M., Bouwman, H. (2010). Explaining mobile internet service adoption by context-of-use and lifestyle, 2010 Ninth International Conference on Mobile Business.

De Reuver, M., Stein, F., Hampe, F., Bouwman, H. (2010). Towards a service platform and business model for mobile participation. 2010 Global Mobility Roundtable.

Derks, D., Bakker, A.B. (2010). The impact of e-mail communication on organizational life. Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 4. Retrieved from https://cyberpsychology.eu/article/view/4233/3277

Desai, D. (2017). Healthcare's hype cycle: which technologies will stay the course? Deep Dive. Retrieved from https://pharmaphorum.com/deep-dive-future-pharma-july-2017/index.htm#!/healthcares-hype-cycle-which-technologies-will-stay-the-course

Dimitrov, D.V. (2016). Medical Internet of Things and Big Data in Healthcare. Healthcare Informatics Research, 22, 156-163.

Editors of Encyclopaedia Britannica. (2018). Behavioral science. Retrieved from https://www.britannica.com/science/behavioral-science

Eppler, M.J., Mengis, J. (2004). The concept of information overload: A review of literature from organization science, accounting, marketing, MIS, and related disciplines. The Information Society, 20, 325–344.

Faraj, S., Jarvenpaa, S.L., Majchrzak, A. (2011). Knowledge co-creation in online communities, Organization Science (forthcoming).

Fernandez, A. (2015). 10 Neurotechnologies About to Transform Brain Enhancement and Brain Health. Retrieved from https://sharpbrains.com/blog/2015/11/10/10-neurotechnologies-about-to-transform-brain-enhancement-and-brain-health/

Friedman, J., Hastie, T., Simon, N., Tibshirani, R. (2016). glmnet: Lasso and elastic-net regularized generalized linear models. R package 2.0–6. Retrieved from https://cran.r-project.org/web/packages/glmnet/glmnet.pdf

Geelen, J. (2012). The Emerging Neurotechnologies: Recent Developments and Policy Implications. Retrieved from http://www.horizons.gc.ca/en/content/emerging-neurotechnologies-recent-developments-and-policy-implications-0

Gentry, J. (2016). Package "twitteR," version 1.1.9. Retrieved from https://cran.r-project.org/web/packages/twitteR/twitteR.pdf

Giles, M. (2010). A world of connections: A special report on social networking. The Economist. Retrieved from http://www.economist.com/specialreports/displayStory.cfm?story_id=15351002

Gosling, S.D., Augustine, A.A., Vazire, S., Holtzman, N., Gaddis, S. (in press). Manifestations of personality in online social networks: Self-reported Facebook-related behaviors and observable profile information. Cyberpsychology, Behavior, and Social Networking.

Hemp, P. (2009). Death by information overload. Harvard Business Review, September, 83–89.

Heninger, W. G., Dennis, A.R., Hilmer, K.M. (2006). Individual cognition and dual task interference in group support systems. Information Systems Research, 17, 415–424.

Hogenboom, M. (2014). Warning over electrical brain stimulation. Retrieved from http://www.bbc.com/news/health-27343047

Howe, J. (2006). The Rise of Crowdsourcing. Wired magazine. Retrieved from http://www.disco.ethz.ch/lectures/fs10/seminar/paper/michael-8.pdf

IQVIA Institute. (2017). The Growing Value of Digital Health - Evidence and Impact on Human Health and the Healthcare System. Retrieved from https://www.iqvia.com/institute/reports/the-growing-value-of-digital-health

Jacoby, J. (1984). Perspectives on information overload. Journal of Consumer Research, 10, 432–436.

Jarvenpaa, S., Lang, K. (2005). Managing the paradoxes of mobile technology. Information Systems Management Journal, 22, 7–23.

Jepson, B. (2017). Medical affairs: learning to change behaviour? Pharmaphorum. Retrieved from https://pharmaphorum.com/views-and-analysis/medical-affairs-behavioural-science-change/

Jones, N.M., Wojcik, S P., Sweeting, J., Silver, R.C. (2016). Tweeting negative emotion: An investigation of Twitter data in the aftermath of violence on college campuses. Psychological Methods, 21, 526–541.

Kane, G.C. (2009). It's a network, not an encyclopedia: A social network perspective on Wikipedia collaboration, Academy of Management Annual Meeting Proceedings, Chicago, IL: pp. 1–6.

Kane, G.C., Azad, B., Faraj, S., Majchrzak A. (2011). Fostering innovation and intellectual capital creation: The paradoxical influence of social media affordances. Working Paper, Boston College.

Kern, M.L., Park, G., Eichstaedt, J.C., Schwartz, H.A., Sap, M., Smith, L.K., Ungar, L.H. (2016). Gaining insights from social media language: Methodologies and challenges. Psychological Methods, 21, 507–525.

Kleinrock, L. (2001). Breaking news. Communications of the ACM, 44, 41–45.

Kosinski, M., Wang, Y., Lakkaraju, H., Leskovec, J. (2016). Mining big data to extract patterns and predict real-life outcomes. Psychological Methods, 21, 493–506.

Landers, R.N., Brusso, R.C., Cavanaugh, K.J., Collmus, A.B. (2016). A primer on theory-driven web scraping: Automatic extraction of big data from the Internet for use in psychological research. Psychological Methods, 21, 475–492.

Ling, R. (2010). Texting as a life phase medium. Journal of Computer-Mediated Communication, 15, 277–292.

Majchrzak, A., Wagner, C., Yates, D. (2012). The impact of shaping on knowledge reuse for organization improvement with Wikis. MIS Quarterly, forthcoming.

Marr, B. (2018). Why The Internet Of Medical Things (IoMT) Will Start To Transform Healthcare In 2018. Forbes. Retrieved from: https://www.forbes.com/sites/bernardmarr/2018/01/25/why-the-internet-of-medical-things-iomt-will-start-to-transform-healthcare-in-2018/#6baedd574a3c

Mayo Clinic Staff. (2017). Transcranial magnetic stimulation. Retrieved from https://www.mayoclinic.org/tests-procedures/transcranial-magnetic-stimulation/about/pac-20384625

Middleton, C. (2007). Illusions of balance and control in an always-on environment: A case study of Blackberry users. Continuum: Journal of Media & Cultural Studies, 21, 165–178.

Miller, P.J., Lubke, G.H., McArtor, D.B., Bergeman, C.S. (2016). Finding structure in data using multivariate tree boosting. Psychological Methods, 21, 583–602.

Morris, M.R., Teevan, J., Panovich, K. (2010). What do people ask their social networks, and why? A survey study of status message q&a behavior. CHI 2010, April 10–15, 2010, Atlanta, GA.

Müller, O., Rotter, S. (2017). Neurotechnology: Current Developments and Ethical Issues. Frontiers in Systems Neuroscience, 11, 93.

Osborne, K. (2018). Could Behavioral Science Crack Non-Adherence? Eye for Pharma. Retrieved from https://social.eyeforpharma.com/patients-and-medical/could-behavioral-science-crack-non-adherence

Pantano, E., Tavernise, A., Viassone, M. (2010). Consumer perception of computer-mediated communication in a social network. 4th International Conference on New Trends in Information Science and Service Science.

Pearl, R. (2018). Artificial Intelligence In Healthcare: Separating Reality From Hype. Forbes. https://www.forbes.com/sites/robertpearl/2018/03/13/artificial-intelligence-in-healthcare/#353a7e791d75

Petito, F. (2013). Four Insights From Behavioral Sciences That Can Improve Healthcare Communications. PM360. Retrieved from https://www.pm360online.com/four-insights-from-behavioral-sciences-that-can-improve-healthcare-communications/

Poole, R., Gulbicki, S. (2017). From 'hit-and-miss' to smart communications: harnessing the power of behavioural science. Deep Dive. Retrieved from https://pharmaphorum.com/deep-dive-future-pharma-july-2017/index.htm#!/from-hit-and-miss-to-smart-communications

Ransbotham, S., Kane, G.C. (2011). Membership turnover and collaboration success in online communities: Explaining rises and falls from grace in Wikipedia. MIS Quarterly, 35, 613–627.

Robinson, R. (2012). Hitting the Target with Behavioral Marketing. PharmaVoice. Retrieved from http://www.pharmavoice.com/article/behavioral-marketing/

Richtel, M. (2008). Lost in e-mail, tech firms face self-made beast. The New York Times. Retrieved from http://www.nytimes.com/2008/06/14/technology/14email.html

Rouse, M. (2015). IoMT (Internet of Medical Things) or healthcare IoT. Retrieved from https://internetofthingsagenda.techtarget.com/definition/IoMT-Internet-of-Medical-Things

Sandoiu, A. (2017). Electrical brain stimulation found to improve working memory. Medical News Today. Retrieved from https://www.medicalnewstoday.com/articles/316370.php

Shih, J.J., Krusienski, D.J., Wolpaw, J.R. (2012). Brain-Computer Interfaces in Medicine. Mayo Clinic Proceedings, 87, 268-279.

Spivak, N. (2004). The emerging problem of 'social overload'. Retrieved from http://novaspivack.typepad.com/nova_spivacks_weblog/2004/01/the_emerging_pr.html

Sproull, L., Kiesler, S. (1991). Connections: New ways of working in the networked organization. Cambridge, MA: MIT Press.

Sorensen, C. (2010). Cultivating interaction ubiquity at work. The Information Society, 4, 276–287.

Sorensen, C. (2011). Enterprise mobility: Tiny technology with global impact on work. Hampshire: Palgrave Macmillan.

Staines, R. (2017). Can digital technology transform pharma R&D? Deep Dive. Retrieved from https://pharmaphorum.com/deep-dive-digital-II-december-2017/index.htm#!/can-digital-technology-transform-pharma-rd

Steinhubl, S.R., Muse, E.D., Topol, E.J. (2015). The emerging field of mobile health. Science Translational Medicine, 15, 283.

Stanley, C., Byrne, M.D. (2016). Comparing vector-based and Bayesian memory models using large-scale datasets: User-generated hashtag and tag prediction on Twitter and Stack Overflow. Psychological Methods, 21, 542–565.

Statistica Portal: https://www.statista.com/topics/1164/social-networks/

Sun, J., Pool, M.S. (2010). Beyond connections: Situated wireless communities. Communications of the ACM, 53, 121–125.

Tarafdar, M., Tu, Q., Ragu-Nathan, T.S., Ragu-Nathan, B.S. (2011). Crossing to the dark side: Examining creators, outcomes, and inhibitors of technostress. Communications of the ACM, 54, 113–120.

Thomas, G.F., King, C.L., Baroni, B., Cook, L., Keitelman, M., Miller, S., Wardle, A. (2006). Reconceptualizing e-mail overload. Journal of Business and Technical Communication, 20, 252–287.

Trusov, M., Bodapati, A.V., Bucklin, R.E. (2010). Determining influential users in internet social networks. Journal of Marketing Research, 47, 643–658.

University of Freiburg. (2018). Neurotechnology - Overview. Retrieved from http://www.neurotechnology.uni-freiburg.de/research/clinic/overview

Weintraub, A. (2018). Artificial Intelligence Is Infiltrating Medicine -- But Is It Ethical? Forbes. Retrieved from https://www.forbes.com/sites/arleneweintraub/2018/03/16/artificial-intelligence-is-infiltrating-medicine-but-is-it-ethical/#-3310f0763a24

White, S.W., Richey, J.A., Gracanin, J., Bell, M.A., LaConte, S., Coffman, M., Trubanova, A., Kim, I. (2015). The Promise of Neurotechnology in Clinical Translational Science. Clinical Psychological Science, 3, 797-815.

Williams, M.L., Dennis, A.R., Stam, A., Aronson, J.E. (2007). The impact of DSS use and information load on errors and decision quality. European Journal of Operations Research, 176, 468–481.

About Impetus Digital

Impetus Digital specializes in managed online solutions for life science advisory boards, working groups, team collaboration, and execution of continuing medical education.

Learn more about Impetus' best-in-class collaboration platform and consultative services by connecting with us via your preferred method below!

impetusdigital.com

meetwithnatalie.com

connect@impetusdigital.com

+1 416-992-8557

Impetus

CERTIFIED WBE Canada WOMAN'S BUSINESS ENTERPRISE