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E-Digital Product Development

PROF. PARUL SHAIR
PG DEPT. OF COMMERECE
DAV COLLEGE, JALANDHAR
EMAIL:parulshair@gmail.com

Abstract
The advances in technology have led to one of the most dynamic and revolutionary changes in the history of marketing, the dramatic changes in communication using interactive media such as Internet. The foundation of the Internet has offered new advanced business transactions and models for the world economy. Internet marketing is born to adapt to this rapid development of online business. The rise of the World Wide Web has provided one of the most challenging environments for product development in recent times. The market needs that a product is meant to satisfy and the technologies required to satisfy them can change radically—even as the product is under development. The main purpose of this study is to bring a general picture of Internet marketing to its readers and dig into how it internet has given a boost to e-product development. The paper will give an insight on tools of product development through internet and how it has bought a revolution in the business world.

Introduction
The rise of the World Wide Web has provided one of the most challenging environments for product development in recent times. The market needs that a product is meant to satisfy and the technologies required to satisfy them can change radically—even as the product is under development. In response to such factors, companies have had to modify the traditional product-development process in which design implementation begins only once a product's concept has been determined in its entirety. Instead, they have pioneered a *flexible* product-development process that allows designers to continue to define and shape products even after implementation has begun. This innovation enables Internet companies to incorporate rapidly changing customer requirements and evolving technologies into their designs until the last possible moment before a product is introduced to the market.
Product developers in industries from computer workstations to banking increasingly face dynamic and unpredictable environments characterized by rapidly evolving technologies, changing customer tastes, and sweeping regulatory changes. In these industries, companies that have begun to adopt more flexible product-development approaches are setting new competitive standards.
With the development of internet and technology, the need for a better experience when interacting with a digital product or system became critical.

Meaning
Digital good/products mean any goods that are stored, delivered and used in its electronic format. Digital goods are shipped electronically to the consumer through email or download from the Internet.
A Digital Product is software enabled product or service that offers some form of utility to a human being.
Examples: car service app such as Uber or Ola, mobile banking app with SBI or Barclays, shoppable H&M or Nike app,
Those can include web, mobile, auto, wearable, VR and beyond. Things are slowly moving beyond the visual interface towards the more natural form of conversational interface. Such examples are speaking with Amazon Echo or accessing services in written conversation in messaging app.

The Digital Age has unleashed three powerful forces:
1. *Continuous change* in customers' needs, priorities, and preferences, especially about what is of value.

2. *Ubiquitous (pervasive, expected to be everywhere, global) innovation:* digitization tools enable an exponential increase in the speed of organizations' ability to harness and apply new innovative technologies to bring products and services to market faster and align them with evolving customer needs. By quickly connecting on a global scale, people at any level can collaborate with colleagues, partners, or customers anywhere in the world to create better ways to do their work or to co-create mutual value products and services that people value and cherish.
3. *Global markets, customers and competition*: the pace of communication and ability to share information globally across customers and organizations means that new customer needs, new technologies, and new competitors can appear at anytime from anywhere in the world.

Digital technologies impacting NPD (new product development) process

- Software such as computer-aided design (CAD) and finite-element analysis (FEA) simulation support the design of new products. Their availability on cloud infrastructure simplifies the access and use of these software applications (e.g., OnShape)
- Artificial intelligence can enhance the design activity itself by exploring myriad solutions in short periods of time, beyond what humans can accomplish (e.g., Autodesk's generative design application)
- Computer-aided manufacturing (CAM), both additive manufacturing methods (e.g., 3D printing) and subtractive manufacturing (e.g., computer numerical control), accelerate the prototyping and manufacturing processes
- Robotic assembly automates the production line
- Computer-integrated manufacturing (CIM) digitalizes the production process, integrating data obtained from the factory floor
- Embedded systems, sensors, and the Internet of Things (IoT), when embedded in the manufacturing environment, permit the real-time capture and analysis of manufacturing data (frequently identified as the Industrial IoT)

In addition to the direct impact the digital transformation is having on the NPD process, digital technologies are transforming the nature of physical products, their monetization, and the innovation process:

- Embedded systems and sensors, when incorporated into products, allow for the collection of detailed data on product utilization and performance
- Software governing the digital components of physical products can be remotely updated to change the properties and behaviour of the product itself
- Analytics of product data can identify new patterns of product utilization, and foresee product failure

Trends/Factors that product development companies should carefully consider in the digital age

1. **Disintermediation** – Open source designs, cheaper and more flexible computer-aided manufacturing systems, versatile assembly robots, and block chain technology enabling trustful exchanges will facilitate the disintermediation of production processes
2. **Participation in production ecosystem** – Increased data sharing in manufacturing and consumption ecosystems, enabled by digitization and application programming interfaces (APIs), will facilitate the integration of manufacturers in production ecosystems and the exchange of data in the network. The growing role of data in the manufacture and innovation processes will lead to new organizational models around the aggregation and analysis of data
3. **Automation** – Automated production and robotic assembly lines will reduce human input in the manufacturing process, increasing efficiency and quality. When companies combine sensor data from those automated systems and predictive models, they will identify new approaches to equipment maintenance
4. **Augmentation** – Artificial intelligence and augmented reality will facilitate the search for design solutions and the data-driven human decision process
5. **Unitary NPD** – Fast and augmented design processes, increasing volumes of data on product requirements and utilization, and cheap on-demand manufacturing will enable agile prototyping, "batches of one," and further product personalization

6. **Accelerated innovation** – Product sensor data will inform the innovation process, while software-governed hardware and shape-shifting materials will enable new approaches to product release. Both processes will accelerate the rate of innovation
7. **Agile NPD** – Product design will need new methodologies to accommodate the co-development of physical and digital components and the changing nature of the innovation process
8. **Data blending** – Data from manufacturing equipment, employees, products, and users will be organized into coherent and persistent digital representations of those entities. Digital replicas will emerge to offer a link between those physical entities and the data accumulated on them. Digital replicas will lead to new forms of data monetization.

The 7 Stages of Digital Product Development

When creating a digital product, whether its an app or simple website, it is important to follow a consistent process in order to produce a consistently successful product. This is going to be a high-level overview of a process that can be adjusted to scale successfully to any project size and complexity.

1. Analysis, Research & Preparation

This step is the main step in product development. Here the company should do everything to make the decision whether they should actually proceed and build the service or save money, time and focus for something different and better. A solution-based approach to problem-solving rooted in "Design Thinking" will ensure the company will invest in the right idea.

- *Empathize with the user and define the needs*

Do a market research to clearly outline the problem that the target audience is facing. Also, find out if they are willing to pay (and how much) for this service the company are about to build?

- *Ideate*

It can be good to use different brainstorming and ideation techniques to think outside the box and reach a wider list of potential solutions. Investigate and test to narrow the list to the best one.

- *Budget*

Of course, initially define what financial assets company have at its disposal. Make sure it has enough resources for the post-launch phase. The product will likely not be profitable from day one and may require further iterations and tweaks to become truly valuable.

- *Minimal Viable Product (MVP)*

Maybe the idea of app or digital product has a very broad scope and many features. But for the first version is it very important to focus on the Minimum Viable Product (MVP). Projects can quickly become over-complex and modular approach will ensure you don't spend resources on features that turn out to be unnecessary. Cut out all the nice-to-have features for now, start with something small and build on it. This approach will make it much easier to change direction if needed.

2. Sketching & Wire framing

This step deals with how this digital product should look. The company can also hire experts to develop the looks of the product.

But it can also be helpful if company come up with initial sketches or wireframes of its vision. This can help experts to clearly understand your idea and make budgeting easier and more precise.

3. Design

How should this product look and feel? If it's an app, how will the screens look on an old Android tablet or brand new iPhone X?

Ask the designers to provide with a clickable prototype. Seeing and interacting with product on the devices where it will be used, will help to view the product from a user perspective. Printouts of screens are less useful, you need to tap, click and experience those designs before approving them.

At this stage it is also good to discuss user interface animations. For example, how will the transition from a closed to open menu look like?

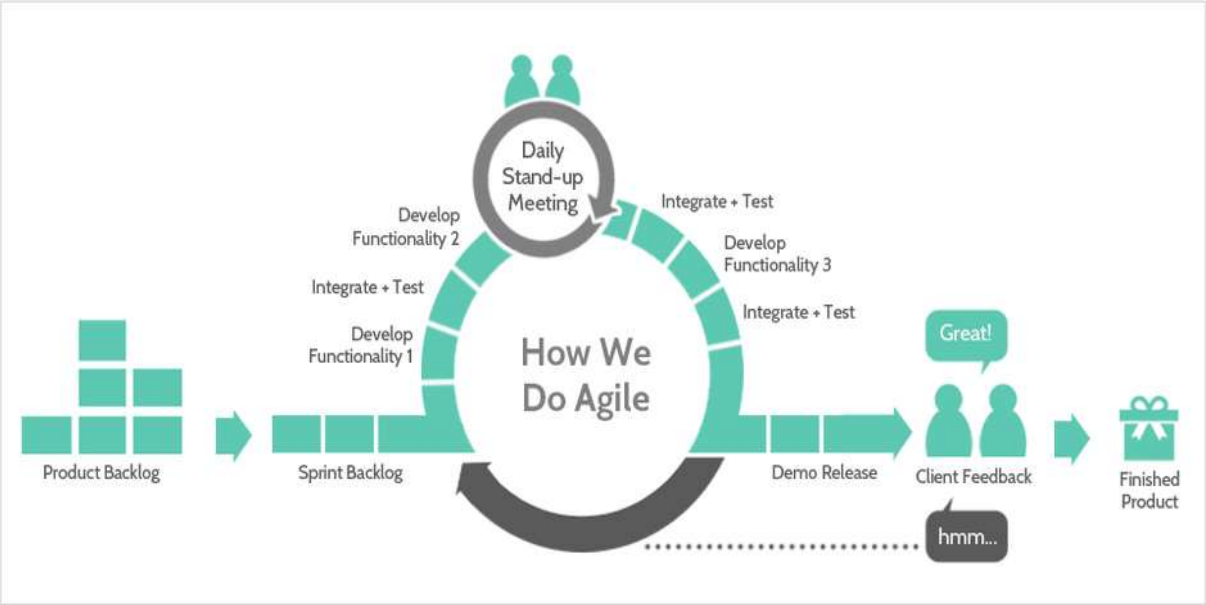
4. Prototyping

Before actually starting development on the first version of the product, have a scaled down version or "prototype" developed. Maybe this prototype will have only a basic design, include only the main features and won't be fully integrated into the rest of architecture.

But once this prototype is developed, the company can run tests with its team and target audience. And see how they react as real users. At this stage the discussion shouldn't be about design, but more about functionalities.

5. Agile Implementation/Agile Development

In this stage the company or the hired team can start coding. Avoid waterfall projects where all requirements need to be agreed upfront and go for an agile approach that supports product evolvement and adjustment. *Using an Agile project management methodology significantly increases development productivity, gives more control and results in an end product that provides real value to users.* As part of this process, the project will be split into development phases known as sprints, with working software delivered at the end of each sprint.



A diagram showing the iterative, Agile approach

- *Testing & Quality Assurance*

Is that app working as it should? On all devices? Is this speed sufficient?
Testing should be built into the development process to make sure you don't run into problems come launch day.

- *Iteration*

A step is not working perfectly? A feature needs tweaking? Users have demanded an additional option? Iterate again and again until the product is ready to go live.

6. Launch

This is the moment where the company is ready to unveil its digital product to the masses. A soft/private/beta launch over a very public launch is also better at first. There always will be bugs or unplanned use-cases in a first version. So being a little cautious and low profile at the beginning can give product the positive start it needs to succeed. It is difficult to win back precious users after a high-profile launch flop.

- *Marketing*

It's time to roll out marketing and communication plan, which have already started planning in the preparation phase. The company knows its personas from its market research, so make sure to know what, and to whom and how you are saying it.

7. Maintenance & Support

Often overlooked, the maintenance and support are not the most exciting part of digital product development. But if product is successful, this will be the longest stage. And might end up costing much more than the initial creation and launch. Often the development partner will offer value for money long

term service level agreements. The company don't want to face the nightmare scenario of post-launch bug-fixes damaging product reputation because the resources have been moved to another project.

Developing Products on Internet Time

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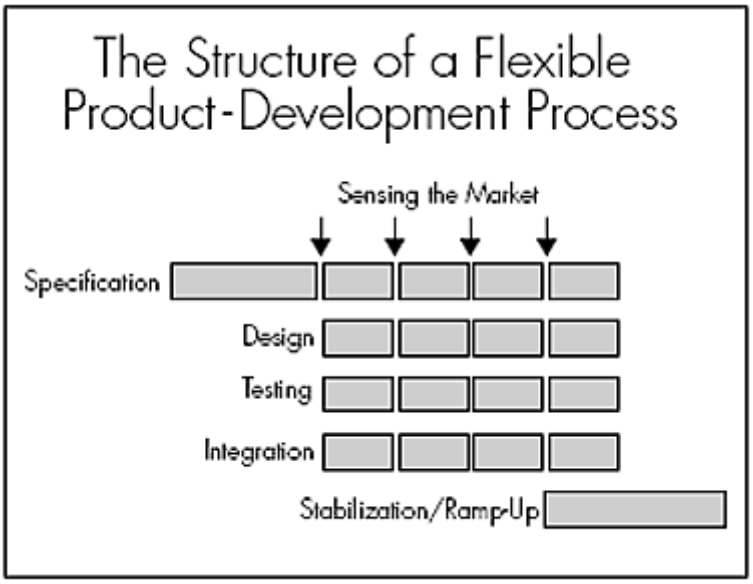
Flexible Product Development Process

Product development flexibility is rooted in the ability to manage jointly the evolution of a product and its application context. The goal is to capture a rich understanding of customer needs and alternative technical solutions as a project progresses, then to integrate that knowledge into the evolving product design. The faster a project can integrate that information, the faster that project can respond to changes in the product's environment.

The value of flexible product development, however, is only as good as the quality of the process it uses to generate information about the interaction between technical choices and market requirements. To acquire and use this information, the development process must be able to sense customer needs, to test alternative technical solutions, and to integrate the knowledge gained of both markets and technologies into a coherent product.



- **Sensing the Market**

The first element of a flexible process is sensing the needs of customers and the market. Flexible projects establish mechanisms for getting continual feedback from the market on how the evolving design meets customers' requirements. They do so by creating intensive links with the customer base—links that range from broad experimentation with many customers to selective experiences with a few lead users. Furthermore, these customers do not have to be external to the company: leading companies make extensive use of internal staff and resources to provide a test bed for evolving new products.

- **Testing Technical Solutions**

Sensing customer and market needs as a project progresses is one element of a flexible development process. If companies are going to allow a product's design to evolve well into the design implementation phase then they also must adopt mechanisms that lower the cost of changes, speed their implementation, and test their impact on the overall system. Such mechanisms allow companies to evaluate and test alternative technical solutions at a rapid rate: the second element of a flexible development process. Early prototypes and tests of alternative technologies are critical to establishing the direction of a project. As a project progresses, the design team must have the capacity to evaluate and test alternative design solutions quickly and cheaply.

- **Integrating Customer Needs with Technical Solutions**

It's no good knowing what customers want in a product under development if the development team can't integrate that information with the available technical solutions. The company should use their intranets to integrate tasks, synchronize design changes, and capture customer information as projects evolve. Thus project teams are able to keep track of the evolving relationships among tasks, schedules, and design changes in a dynamic way. Such integrating mechanisms are essential for managing a flexible process, given the many rounds of experimentation and the wide range of information generated. Without a way of capturing and integrating knowledge, the development process can quickly dissolve into chaos, with ad hoc design changes creating masses of rework because of unanticipated interactions with other components in the system.

- **Putting Flexibility to the Test**

In combination, the foundations of a flexible product-development process allow a company to respond to changes in markets and technologies *during* the development cycle. A flexible approach allows companies to respond to changes in markets and technologies *during* the development cycle.

Key ways to develop better digital products, faster

1. Involve customers in the design process from the outset
2. Obtain feedback from right across the organisation, not just the design / tech teams
3. Use data and analytics to make decisions wherever possible
4. Keep product designs at prototype stage and keep iterating until you're confident to employ development resource
5. Use A/B testing when possible to improve conversion
6. Give customers a clear way to provide feedback
7. Bring in external UX / Product consultants to provide independent input

Advantages of Digital Products

1. Lower overhead costs

Running a digital product store requires far less overhead than selling physical products – no physical storage, manufacturing, packing, or shipping and handling costs, can also skip the rent, electricity, staff. With a digital product store, many things can be fully automated, from customer accounts and communications, to the digital delivery of your products.

2. The internet is a large market

Running any kind of online business gives the ability to reach a global audience – at least any audience with reliable internet access, digital product stores allow you to do business anywhere in the world, with very few limitations.

Online, it's easy to find niche communities that will support all kinds of different products, with a vast array of options and needs to fill

3. Lower barriers to entry

If you have any creative skills – in writing, design, music, video, education, or other fields – there is nothing stopping you from creating and selling digital products. On the whole, they are usually quicker and simpler to make, depending on the complexity of the product, and there are plenty of tools and resources to help you get started. Ultimately, as long as you have a quality product, a PayPal or Paytm account, and either a digital product marketplace account or your own website, you can get up and running with relatively low risk and minimal financial investment.

Depending on your product type, you can also create digital products completely independently without relying on others, which allows you more flexibility to do things exactly how you want and at your own pace.

4. Profit margins are irresistible

One of the biggest benefits of digital products versus physical products is profit. Without the costs of physical materials and other factors associated with the creation of physical products, the profit margins for digital products can be quite high. Even in case of an online store that sold physical products, one need a website with e-Commerce tools, as well as a way to facilitate payments and customer accounts. All of this would be in addition to managing the physical side of your business, whereas selling digital products consolidates all of your business activities into the digital realm, meaning less costs and more profit.

5. Digital products last forever

Unlike physical products, digital products are not subject to wear, tear, or deterioration; they may become less relevant over time as technology changes, but they can be updated easily, and they last forever. Digital products can be used indefinitely, remaining in the same condition as they were the day of purchase.

6. Never out of stock

Due to the nature of digital products, one can sell as many copies with unlimited duplication and shelf life. Some digital products sell for years and years, bringing in consistent passive income and significant returns on time, energy, and financial investments. Customers never have to worry about items being out of stock, the product is always immediately available for purchase.

In terms of benefits over physical products, it's also easy to release product updates, revisions.

7. Easier to manage, sell, and deliver

Managing digital products is far easier than dealing with physical stock, requiring only digital storage and a content management system to keep things organized. There is far less to do in terms of day-to-day management, and a digital product store can essentially be created and run using just laptop – or even just a phone.

Selling and delivering digital products also tends to be much more streamlined than selling physical products. Customers can quickly and easily experience digital product demo, making the purchase process much simpler and more straightforward. The online purchase process is not only the new cultural standard – it's also the fastest. Nobody needs to travel anywhere to get your products, nor do they have to wait days or weeks for delivery. Files are typically digitally distributed or available for download immediately after purchase, which means that customers can make use of your products right away. Transactions such as refunds are also easier to manage, as there's no extra packing, shipping, or handling required.

8. Direct lines of communication

Digital products offer unique ways to communicate directly with customers, and even build entire communities around products. It's enticing, easy, and effective for customers to sign up for a mailing list or newsletter in exchange for immediate access to digital downloads (something that can't be achieved with physical products) giving them direct access to you – a personal touch that creates extra value for them and sets a foundation for future releases.

9. it's the way of the future

Digital products cater specifically provide people with the education, entertainment, tools, and resources they need to enhance their lives in one way or another. It is unlikely that these types of products will go out of fashion anytime soon, so it's still a great time to get in on the action.

10. Personal freedom and lifestyle

If one wants to run own business, be location independent, have the freedom to be creative, and produce own products, then selling digital products is best option. With all of these benefits, as well as the potential for substantial ongoing passive or semi-passive income, digital products can be the ticket to an entirely new lifestyle that is free from the costs and restrictions of dealing with physical products. It can be done from almost anywhere and with billions of dollars in revenue; there are plenty of opportunities to create something valuable while generating income at the same time.

11. No inventory

Digital commerce is traditionally low risk. Because one doesn't have to invest in inventory, avoid storage costs and don't have to worry about ordering enough units to meet demand.

12. Infinite scale

Digital products can be scaled far quicker than physical products and without the need to invest in additional storage space (or staff) to deal with the growth.

13. Simplicity

Forget time consuming stock management and shipping calculations. With digital products, all you have to do is click send.

14. Instant 'free' delivery

Perhaps one of the biggest benefits of selling digital products online is that delivery is virtually free and instant. Say goodbye to long post office queues and lengthy delivery times.

Disadvantages

1. **Harder to demonstrate value**

Selling a digital product requires a great deal of time and effort. Getting buyers to the point of purchase generally involves more planning, explaining and demonstrating than physical products.

2. **Lower perceived value**

Digital products aren't tangible; they aren't 'real'. As a result, they often have a lower perceived value.

3. **Product development is time consuming**

Getting a digital product ready for market takes a great deal of planning and testing. For a digital product to be launch ready it must be thoroughly tested and of extremely high quality from the outset. It involves a huge amount of money and time.

4. **Competitive**

Digital commerce is booming. Everyone wants to do it. There are many perks in selling digital products such as free delivery, no shipping costs, and minimal overheads. Owing to all these more and more people are entering in digital product development and selling due to which it has become very competitive.

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