Digital DIY – Reshaping of Business Roles

This module provides a general framework regarding the implications of DiDIY within work organisations. In particular we will focus on three main areas in which the phenomenon of DiDIY reshapes the work of a worker and her/his supervisor within organisations and the entrepreneurial environment, and guides the strategic decisions of top management (CEO) within organisations.

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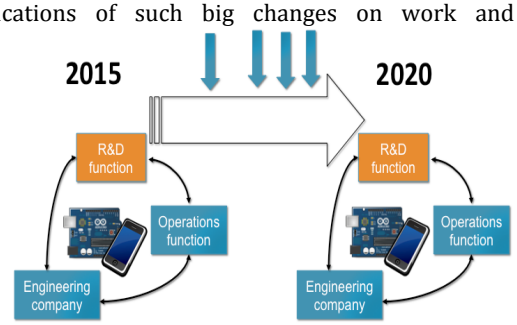
Reshaping of Business Roles

A "digital tsunami" brought by new computing capabilities and a rise in digital data generation is impacting on organisations. The diffusion of disruptive digital technologies such as additive manufacturing, autonomous robots, data analytics tools and industrial internet of things (IoT) is transforming the manufacturing value chain, from research and development, supply chains, and factory operations to marketing, sales, and service. Both academics and practitioners are investigating the implications of such big changes on work and organisations: What is the impact on people, processes and costs?



Within this changing context it seems that Digital DIY is reshaping business roles, i.e. the way employees as long as managers carry out their activities. If before they would have needed a specialist to perform specific tasks, today's digital technologies are enabling them to carry these out on their own. Concepts of flexibility, coordination and collaboration are some of the main topics that have to be investigated within the organisational context.

An example that can provide clarification is related to the best-known IT-enabled change nowadays: the introduction of 3D printers into the organisational context. They can play a significant role in affording opportunities for various component makers to deliver physical products through the digital channel and thus co-creating new avenues for new value; moreover they can disrupt traditional production models and competitive rules. Together with 3D printing other technologies are similarly impacting on organisations and reshaping how activities are carried out. In general, we are facing a "digitisation" of the manufacturing sector, and a "democratisation" of the different technologies introduced within an organisation is in place. Summarising what we have explained before, it is important to understand the impact of this transformation both at a strategic level and at an operational one. Specifically, it is important to understand how new business roles are reshaped by the rise of new DIY technologies and how these professionals (e.g. workers in a manufacturing company) have to advance their skills (coordination, collaboration, people management among all) to fill the gap generated by the introduction of these new digital technologies.

Examples:
The introduction of digital technology for tracking materials in the operation department and warehouses freed the workers of operational tasks and allowed them to gain autonomy (with respect to their head of department) in the management of the decision process, thus enriching their job profile with more sophisticated tasks.

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Entrepreneurship and Digital DIY: a New Revolution
Entrepreneurship in the context of digital DIY seems to be a meta-theme that crosses different disciplines (economics, engineering, sociology, etc.). Many scholars have recently begun to investigate this phenomenon and to analyse the implications of the impact of Digital DIY on how to change the concept of entrepreneurship, competitiveness of businesses and territories, intelligent production clusters, etc.

One of the first implications that has emerged concerns the places where business and digital technologies are combined. These are not only physical spaces such as hackerspaces, makerspaces, and hardware incubators, but also virtual on-line community spaces such as Etsy and iFixit that work on platforms, websites etc. In these places, individuals, who are often not specialists but amateurs, acquire information and exchange views on how to:

- improve or customise existing products in order to adapt them for their specific purposes (e.g.: modify the handlebar of a bicycle to make it more comfortable for those who have lost a limb and who require a specific coupling to maintain the grip);
- create completely new products to be tested and then put into production;
- create or modify software with the same needs as above.

These meeting places are amplifying the innovation phenomenon openly as it has never happened before, and the number of people involved in the generation of this change, both technological and social, is increasing rapidly.
These communities are becoming real places of co-designing, testing and crowdfunding. In other words, it is here that start-uppers (future entrepreneurs) come in order to turn their business ideas into prototypes, and obtain advice in order to improve a product before marketing and raising funds. The progressive democratisation of 3D technologies or access through makerspaces, FabLabs, etc., to costly and sophisticated technology is transforming the ways and places, in which entrepreneurs and relationships are formed and in which financial backers are found. If, traditionally, the process of developing a business idea to its realisation was passing through

the phases of conception, drafting a business plan, searching for banks or financial funds who would agree to take the risk of financing the enterprise and, finally, its implementation, now the process is different; the new idea has already been shared and improved in its prototype phase, the search for funds is done on websites where future product clients agree to finance a portion of the project (crowdfunding), and post-marketing begins with a product that already has its audience of appraisers and users. The concept and the places in which entrepreneurship develops are, therefore, changing profoundly; modifying the paradigm of entrepreneurship.

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A Critical Role: the CIO

Chief Information Officers (CIO) are facing several challenges nowadays, among which exploring new demand-side opportunities, together with the exploitation of supply-side IT resources, is a quite critical aspect. Being agile and adapting to fast-changing market conditions is an imperative that executives should respect. A second condition is to reduce operational costs while improving organisational efficiency. Within this double-fold context C-level executives should adapt their roles in order to be competitive in the long run.

The context, characterized by the presence of digital technologies reshaping organisational settings, asks for a cultivation of practices and sense-making around technologies. To drive this digital transformation managers should become "shepherds": leading the change, transferring knowledge and empowering people exactly as a shepherd does. The CIO is traditionally the executive of choice when dealing with an IT-enabled transformation given their skills-set, but sometimes their interpersonal capabilities and their vertically shaped set of competences lack the necessary attitude. Eventually, CIOs need to be strongly connected to operational levels in such a way that they need to work with design, manufacturing, and quality teams to determine what data should be collected and maintained.

Ruth Meyer 28/3/y 18:31

Commenta [1]: This seems a bit of a weird analogy. To me, a shepherd is herding sheep, not people, so how exactly is his work associated with "leading change, transferring knowledge and empowering people"??

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A Perspective on Ethics Implications

While digitally-driven devices like 3D printers are already reshaping industrial manufacturing, some expect their use for purposes of DiDIY to significantly impact supply chains and to lead to the spread of "distributed manufacturing", a state of affairs in which a significant number of people no longer purchase consumer goods the traditional way, from commercial manufacturers, but instead use digital devices to make the objects they need themselves, or purchase those objects locally from hobbyists who produced them with the help of such devices. Is this a likely scenario, and if so, will it contribute to technological unemployment? At the societal level, should we take measures to forestall this, and if so, which ones?

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Definitions

- ✓ *Digitisation:* can be defined broadly as "taking manual or offline business processes and converting them to online, networked, computer-supported processes".
- ✓ *Democratisation:* "refers to the process by which access to technology rapidly continues to become more accessible to more people. New technologies and improved user experiences have empowered those outside of the technical industry to access and use technological products and services" (Wikipedia).

FURTHER RESOURCES

Articles:

- ✓ Aldrich, H. E. (2014). The Democratization of Entrepreneurship? Hackers, Makerspaces, and Crowdfunding. Conference Paper, Academy of Management annual meeting, Philadelphia, PA.
- ✓ Banker, R. D., et al. (2011). CIO reporting structure, strategic positioning, and firm performance. MIS quarterly, 35, 2, pp. 487-504.
- ✓ Carter, M., Grover, V., Thatcher, J., B. (2011). The emerging CIO role of business technology strategist. MIS Quarterly Executive, 10, 1, pp. 19-29.
- ✓ D'Aveni, R. (2015). The 3-D Printing Revolution. https://hbr.org/2015/05/the-3-d-printingrevolution.
- ✓ Davenport, T. H., Kirby, J. (2015). Beyond Automation. June https://hbr.org/2015/06/beyondautomation.
- ✓ King, J., L. (2011). CIO: concept is over. Journal of Information Technology, 26, 2, pp. 129-138.
- ✓ Kuznetsov, S., Paulos, E. (2010). Rise of the Expert Amateur: DIY Projects, Communities, and Cultures. NordiCHI 2010. Proceedings of the 6th Nordic Conference on Human-Computer Interaction: Extending Boundaries. pp. 295-304.
- ✓ Lindtner, S., Garnet, H., Dourish, P., (2014). Emerging Sites of HCI Innovation: Hackerspaces, paper presented at One of a CHInd, Toronto, ON, Canada.
- ✓ Williams, A., Nadeau, B. (2014). Manufacturing for makers: from prototype to product. Interactions, 21, 6, pp. 64-67.
- ✓ Porter, M.E., Heppelmann, J.E. (2015). How Smart, Connected Products are Transforming Companies. Harvard Business Review, pp. 97-114.
- ✓ Quinones, P. A. (2014). Cultivating practice & shepherding technology use: supporting appropriation among unanticipated users. Proceedings of the 17th ACM conference on Computer supported cooperative work & social computing.
- ✓ Tallon, P. P. (2014). Do you see what I see? The search for consensus among executives' perceptions of IT business value. European Journal of Information Systems, 3, pp. 306-325.
- ✓ Tanenbaum, J., Williams, A. M., Dejardins, A., Tanenbaum, K. (2013). Democratizing Technology: Pleasure, Utility and Expressiveness in DIY and Maker Practice. Conference CHI 2013: Changing Perspectives. Paris. France. pp. 2603-2612.

Tiwana, A. (2014). Separating Signal from Noise: Evaluating Emerging Technologies.

DiDIY
DIGITAL DO IT YOURSELF

MIS Quarterly Executive, 13, 1, pp. 45-61.

LEARNING ACTIVITIES

You may choose the activities that you like the most, although we recommend that you try everything. Please document each of your chosen activities and publish your documentations in the appropriate location, so peers can access them and contribute feedback. [LINK to course spaces, forums, recommendations on social network uses, #hashtag]

- Read about and collect examples of 3D printing introduced in a manufacturing context. Try to identify the big changes brought by this technology. Try to identify if it has impacted on flexibility, coordination of workers, resources and/or people management.
- Read about and collect examples of autonomous robots introduced in a manufacturing context. Try to identify the big changes brought by this technology. Try to identify if it has impacted on flexibility, coordination of workers, resources and/or people management.
- Look for a makerspace or fab lab in your area, (try to) visit it and ask those who attended to tell you what they do. Share the experience online and do not forget to provide the contacts of the makerspace you have visited.
- While visiting a makerspace or fab lab try to interview an entrepreneur who is working on their project in order to extract their experience. Try to understand what has helped them to develop their business idea in the makerspace, then write a quick guide to share online.
- Go online and visit Etsy.com or Kickstarter.com to see how information on ways to improve a product is exchanged. Select a product and try to follow its evolution in terms of design and research funding, then write a quick guide to share online.

QUESTIONNAIRE

1. How is DiDIY reshaping business roles?
    a. Professionals continue to outsource specialist activities to specialists.
    b. Professionals can now perform specialist activities themselves due to advanced digital technologies.
    c. I do not know.

2. Do you think it is relevant to develop new skills given the introduction of DiDIY technologies?
    a. Yes. Professionals have to improve a specific set of skills such as coordination and people management.
    b. Partly. Professionals can continue to carry out their activities and think about improving their skills later.
    c. No. Professionals can continue to carry out their activities as they do now.

3. Why is entrepreneurship in the digital DIY context called a meta-theme?

a. Because it crosses several disciplines.
b. Because it is not tangible .
c. I do not know.

4. What kind of information do people exchange in makerspaces?
   a. Recipes.
   b. Information on how to improve their products.
   c. Information about software and hardware.

5. Are makerspace/hackerspace (etc…) contexts facilitating the diffusion of open innovation practices?
   a. Yes they do and this appears to be a growing phenomenon.
   b. Yes they do but it is not crucial.
   c. The answer can not be inferred from the text.

6. What are the most qualifying competencies of a modern Chief Information Officer (CIO) in the context of the DiDIY phenomenon?
   a. The CIO should be an expert in coding or in developing new hardware devices.
   b. The CIO should be able to manage a large team of employees of the IT department and IT consultants.
   c. The CIO should be able to frequently re-design the IT infrastructure in collaboration with business people.

Answers: 1-b, 2-a, 3-a, 4-c, 5-a, 6-c.

This project has received tunding trom the European Union's Horizon 2020 research and innovation programme under grant agreement No 644344.
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