How to face the scientific communication today

International challenge and digital technology impact on research outputs dissemination

edited by
Marco Medici
Valentina Modugno
Alessandro Pracucci

dottorato di ricerca

tecnologie dell'architettura

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PART III – CONCLUSIONS
edited by Alessandro Pracucci

In ricordo di Romano Del Nord

Primo fra i pari Romano Del Nord ha avviato gli allievi alla comprensione sistemica della Tecnologia dell'Architettura, alla padronanza del metodo della ricerca, li ha incoraggiati nel concepire e progettare i loro studi, a sintetizzare idee nuove e complesse, a comunicarle alla comunità scientifica ed alla società, per promuovere nei diversi contesti i risultati ottenuti. Ha fatto di loro dei ricercatori.

In memory of Romano Del Nord

First among his peers, Romano Del Nord initiated generations of doctoral students to methodical and comprehensive understanding of Tecnologia dell'Architettura, he introduced them to the mastery of the research process, he empowered them to conceive and design ideas, to systematize new complex concepts in order to present them to the scientific community. From each of his students he created a researcher.

Acknowledgements

The editors would like to thank two anonymous referees for their valuable comments on earlier versions of this volume.

All the authors would like to thank the several referees of the international scientific committe.

PREFACE

The present book *"How to face the scientific communication today. International challenge and digital technology impact on research outputs dissemination*", a volume of DOTTA series edited by Firenze University Press – FUP, is a collection of critical essays developed and discussed inside the OSDOTTA network. The book is the final work of a systematic collection and synthesis of ideas and feedbacks, that the authors have worked on since the 11th Seminar of the network OSDOTTA "*Publishing strategies and scientific investigations: how to face them today*?", took place in November 2015 at the Department of Architecture of the University of Ferrara. Consequently, the present volume goes deep inside the issue of communication of research results and its instruments, in particular, focusing on the issues of publications and evaluation of the final products.

Starting from reflections on the research of PhD students of the disciplines of Architectural Technology (Academic Disciplines ICAR/12) and Design (Academic Disciplines ICAR/13), part of the macro area 08/C1, the curators have created a path of essays to contribute in the current debate on the communication and dissemination of scientific results, in particular in relation to doctoral thesis and ongoing scientific activities carried on at national and international level, developing a work addressed to PhD students and the whole scientific community.

The book gathers contributions of national and international PhD candidates, PhDs and Professors, in three different sections of the volume. The aim is to investigate the topics of communication and dissemination of research activities and results into appropriate and high-quality products evaluable by the scientific community of reference.

In the first section, edited by Valentina Modugno, the topic is introduced with three essays which investigate the scientific assessment of architecture (Vincenzo Riso), the role of dissemination of research activities (Daniela Bosia) and the importance of network and associations in publication strategies (Valentina Modugno).

The second section, edited by Marco Medici, collects essays by different PhD candidates and new PhD, mainly in relation to their individual researches carried on during their PhD programmes. The

section shows differences and similarities of how dissemination strategies depend on the specific area of study and investigation, which asks for peculiar solutions based on the characteristics of single research. This part of the book aims at offering a scenario of how PhD candidates are aware and prepared to meet the challenges of publication and dissemination requested by scientific community.

The third section, edited by Alessandro Pracucci, collect final considerations emerged by essays and the ongoing discussion, deepening elements of current debate in scientific community. At this aim, the discussion on the issue is enriched by contributions on the central role of architectural technology in anticipating future research scenarios in order to achieve the highest level of originality and compentece in PhD programs and in the scientific evaluation of their products (Theo Zaffagnini), the importance of the protection of research results (Giuseppe Mincolelli), the digitalization developments in publication (Maria Antonietta Esposito) and the characteristics of excellence in scientific products (Maria Chiara Torricelli).

The book aims to offer information and helpful comparison for PhD candidates, but not only, to improve doctoral research training and awareness on these issue. Indeed, insight and promotion of a suitable models and tools of dissemination of research works into the scientific community, is fundamental in PhD programme activtites to acquire communication skills as expected by the Dublin Descriptors. Nowadays more than in the past, in PhD training is crucial a preparation work to acquire skills on dissemination and publication strategies with the goal to spread our own research in the academic world and to final user, as well as to allow the research to be checked and scientific evaluated for quality and scientific validity of its outcomes.

The book is a contribute in the current opened debate in the national and international scientific and academic community on the most effective tools to design specific dissemination strategies, defining detailed and reasoned ways able to highlight and improve qualities and disciplines of each single research.

Marco Medici
Valentina Modugno
Alessandro Pracucci

The importance of architectural technology background and originality in an effective scientific research process

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Abstract

The doctoral training – nowadays as far as in the past – should deeply understand the meanings of researching scenarios of innovation defined by sudden changes dued to a continuous availability of new technological innovations added to urgent social or market demands.

The training should consider , especially in architectural technology design field, how in the past this kind of cultural challenges has been ruled by other main discipline scientists and which are the real resources and goals of the contemporay scientific research able to influence the future.

Likewise the encouragement to a modernised creativity in researches topics based on the awareness of the new possibilities offered nowadays by available innovative material and immaterial technologies. Thinking that the doctoral training action is itself the result of a research path and a planning act for the future, lead us however – essentially – to spot pre-emptively the prevailing contemporary researchers skills required.

The dissemination ability of the researcher into the global scientific community will be another important issue to manage. The quality of the research activity outcomes, in the future more than today, will be checked through the analysis of the scientific impacts mesaured in the global publishing science area, or better, in the 'native' scientific area of the researcher.

From this angle, the researcher should bring out his best to build up his own prestige in the local, national and international scientific sphere; this will bound him frequently to consciously assume some risks in his actions. This last istinct is - in conclusion - one of the most appreciated ability in resarch work teams.

Medici M., Modugno V., Pracucci A. (eds.), *How to face the scientific communication today. International challenge and digital technology impact on research outputs dissemination.*, ISBN (online) 978-88-6453-497-8,

Well-established disciplinary experiences aiming at goals that, until recently, have been key to technological research, appear nowadays to be distressed by a continuous and rapid mutability of the big picture they operate in. For this reason, they are trying to find a profitable re-positioning in the research and development dynamics dictated by new market models and a different, weaker layout of the industrial sector.

This reaction has always been considered winning by numerous scholars investigating the change of social and urban scenarios and, in particular, the strategies to adopt to face this change adequately. Kevin Lynch[1] perfectly summarises this dynamic when he states that: "*Exploring and testing future alternatives can be thought as one way of maintaining our ability to respond to change*".

Such ability focuses on the creation of alternative scenarios of innovation. The adjective "alternative" here implies the need for the possibility to choose from different kinds of development. Exploration and experimentation, both typical of the scientific research carried out on any scale and applied to any scenario (and different disciplines), are the only way to expand the known horizons and make the improvements achieved replicable.

These few words, as far as the tertiary education is concerned, have to be constantly repeated in order to lead the PhD candidates towards a pragmatism that, unfortunately, is either only partially adopted, or completely absent. Obviously, this doesn't mean downgrading the importance of theoretical PhD research, but, instead, making it more effective. It means enabling it to define its spheres of action, set clear goals and identify its recipients, clearly state the original methods adopted to achieve the aforementioned goals and the verification and validation tests carried out.

The constant adaptation to the mutability of the scenarios – a practice that is well-established and refined by the philosophers of science – seems to be the only possible solution also because of a sort of *scientific resilience*.

Therefore, if the general meaning of the term resilience denotes the time taken by a certain community (the scientific one in this case) to return to its initial state (the maximum adherence to the reality of a society that continuously changes and the market needs) during or after a disturbance, having clear in mind the disciplinary environment to operate in becomes paramount.

This is also the reason why the policies[2] of the discipline were formulated. These policies are concise manifestos that define exhaustively

the entire spectrum of ranges of action of every single research field.

For the specific case of Architectural Technology, we would like to quote as a summary of our national policy the effective and iconic definition of the role played by the discipline formulated by the English Technologist Stephen Emmitt[3]. "*Architectural Technology is the 'constructive link' between the abstract and the artefact.*"[4] [S. Emmitt, 2011] This statement remarkably evokes the essence of our discipline (and, for extension, that of the other disciplines belonging to the examination macro sector 08/C1).

Giuseppe Ciribini, undiscussed master in this field and in that of industrial design, in his book "*Tecnologia e progetto: argomenti di cultura tecnologica della progettazione*"[5], describes this constructive link as the study of the transformations of the matter and of the information applied to the project and to the architectural artefact.

An ample vision, multidisciplinary and inclusive of the goal of an architecture based on a rational and pragmatically approach for the realisation of the same. A reification that solely relies on a need-performance approach without denting at all the creativity of the project or, in other wordsmith "*(…) that process of simulation (or 'virtual representation') of the forces involved.*"[6] [Giallocosta G., 2011]

However, it is interesting to quote another definition of technology, still by Ciribini, contained in a volume edited for the 7th SAIE Salon of Bologna and entitled "*The Technological Boomerang*"[7]. This definition seems, indeed, to be still very current and important to fully understand the very essence of the technological research even decaded after its formulation".

"(…) *The term TECHNOLOGY nowadays normally indicates the general set of operations of transformation of the matter or of the energy (and, ultimately, of the human habitat) to take them from a prior to a subsequent state. Therefore, technology can be considered the "DISCIPLINE OF THE PROCESSES", that's to say, the study and coordination carried out throughout conceptual and operational tools, the operations that followed one another over the course of the time according to different courses of action that depend on the final situations. As a discipline, it certainly has its own methodological and critical foundations, both multidisciplinary and interdisciplinary in nature. These interdisciplinary subjects mainly are: the logic of systems, for the operations and the processes are structured, and therefore they are systemic entities; cybernetics, automatics or the theory of management and communication in human beings and machines, the theory of information and the science of signs that completes it. (…)"* [Ciribini G./1971]

The choice of these texts here serves various purposes. Firstly, it

reminds the new generations of researchers of the thought of those who contributed to create the lines of actions of the scientific paths of excellence for the research on the technological planning of architecture. Secondly, it lays down the foundations for some critical evaluations and considerations that we are going to make later.

The synthesis capability and the focus on the expressive form used to describe the meanings of technology and on finding the essence of the discipline in the processual and systemic dynamics are amongst the most relevant aspects of the afore quoted text to be taken into account, but maybe not the only ones worthy of further investigation.

In fact, probably, the added value of these definitions and/or descriptions of the operating environments needs to be found in evaluations that are very different from one another.

The author quotes, amongst other disciplines, cybernetics and automatics to express the need for an interdisciplinary approach.

It is important to notice how, in the Seventies, when these definitions were being formulated, these interests represented the overcoming of a limit of the scientific knowledge of the time. A boarder that hasn't been marked yet and is rarely experimented with, especially in the architectural and construction field.

Therefore, the ability of the Masters to anticipate future reality and their far-sightedness in understanding the need for methodological interdisciplinary policies in order to preserve these pioneering paths is really remarkable.

Even though cybernetics represents, for some schools and for a certain period of time, one of the most appealing challenges of the time, it isn't the only important challenge faced during those years.

It is worth mentioning other innovative scientific methods aiming at the creation of pragmatically ways of helping potentially similar worlds to open a dialogue and interact with one another. Let's take as an example the study of the possible ways of applying to architecture and, more in general the construction field[8] , of the first electronic labs (of civilian use).

The intuition of using scientific disciplinary spaces related to cybernetics has certainly had a great impact on some of the contemporary digital dynamics applied also in architecture and in the building scale. Nowadays, this is mostly shown by some research carried out in the context of innovative projects bases on algorithms and Artificial Intelligence for the optimisation of the performance of the components and the dynamic control systems used for the buildings, not to mention

the applications that are useful to some managements to qualify the contemporary *smart city*.

PhD formation has to both find its purpose and its important social utility and aim at the individuation of original operating environments able to identify the market's and demand's need earlier than demanded (rather than in virtue of the development of new technologies).

The concept of *Research Excellence* expressed in the EU Directorate General for Research and Innovation document entitled "*Principles for Innovative Doctoral Training*" [9] academically describes these needs by stating that *"(…) the new academic generation should be trained to become creative, critical and autonomous intellectual risk takers, pushing the boundaries of frontier research*."

This document specifies the minimum expertise the PhD students have to gain throughout their training. Amongst these excellence criteria we find: the ability to transfer knowledge between scientific environments and the business world. This objective is just as fundamental as the *networking* and *project management* skills and the PhD student's knowledge of economic matters.[10]

Therefore, the sphere of academic knowledge is only a part of a much ample room and more significant process that is nonetheless vital to understand and optimise the operations environments. This sphere of knowledge has also to be the ground where the researchers find their path and are formed to achieve the highest level of competence if the PhD program aims at the competitivity and scientific relevance of its students on a global scale.

The originality of the *research proposals* (or of research in general) is therefore of great importance, distinctive and a true sign of innovation. In order to achieve this goal, it is undoubtedly necessary to prefer relevant ideas that can foresee future scenarios over little progress in well-established knowledge.

Equally, experimenting and interacting with the productive, industrial, professional and social worlds has to be privileged overdue their developing well-known operational tools in research fields that have already been profusely investigated.

The activities coordinated by the different scientific associations are certainly great help in the initial stages of analysis of the interested areas. They are, indeed, critical and informative tools of the current operational environments of the different scientific areas. They are part of a broader scientific control system that is able to provide important contributions in order to synthesise and understand the main research

areas of social interest on the national and international markets. To be consistent with the purpose of this text, we are now going to take into consideration as an example case the role played by the Italian Association of Architectural Technology (SITdA).

Apart from the association regulations, that include old and new spheres of action (such as being the privileged institutional interlocutor and the main point of reference for the industrial and construction sector), SITdA created TECHNE, a Journal of Technology for Architecture and Environment and created interesting spaces where different disciplines can confront with one another and showcase their current researches (national and international).

Moreover, thanks to an intense *teamworking* activity carried out by researchers and scholars of this field, the scientific Association classifies and analyses in progress the main streams of technological research grouped by thematic clusters (as of now, *Environmental Accessibility, Nearly Zero Energy Building, Achitectural Heritage, Building production - Building product, Environmental Design, Recovery and Maintenance, Services for the Community, Social Housing*).[11]

This new creativity of the research proposal, obviously needs to be found not only in these few operating environments, but maybe it can create new ones of future relevance starting from the existing. The originality explores and expands, even by modifying them, some methodological limits that are encountered especially when a transfer of knowledge between different disciplines is needed. It plays a role in the relationship between material and immaterial technologies by finding missing and therefore innovative tools and in the relationship with society and the market. This is nowadays particularly significant for the traditional objectives of product and process innovation, peculiar to technological architecture, need to be extensively revisited in their meaning considering the complex global and digital picture.

However, all of these will be able to succeed only if he researcher is aware of the fact that the originality of a proposal always lays in an insatiable cultural curiosity

Conclusions

The recent introduction in Italy of new methods and evaluation criteria of scientific research to select the teaching and researching staff (with the ultimate goal of stimulating the qualitative and quantitative increase of the research), caused an increasingly bigger lack of enthusiasm for the adoption of less known lines of research (the trans-disciplinary

ones in particular), instead of relaunching them.

This is motivated by the existing risk of a potentially inhomogeneous evaluation of these choices by the people who evaluate the scientific products of all the scientific areas involved in the process because of the well-established habit of using different evaluation criteria (for example, bibliometric vs non bibliometric).

Even though this dynamic concerns the people who are already working at Universities, we can't hide the fact that choices of the teaching staff, PhD candidates or Senior researchers working in the PhD programs will affect by emulation the scientific production of the PhD students.

The right importance given to incentive the international pervasiveness of the scientifically products of the architectural schools has caused many to change their good personal habits of scientific reporting. The adoption of the only English language for the texts and the new – for somebody – strategies of dissemination of the final and intermediate results on magazines or in international conferences are only some examples of this change in habits.

Certainly, the habit of confronting oneself with their own scientific community throughout the systematic adoption of methodic revision of the works of the *Double Blind* type also in architecture, a sector that isn't yet totally rooted in the bibliometric evaluation, will enrich its products.

Equally, the systematic introduction, in the PhD formation, of *Referee* and *Experts* to give independent judgment to help the local committees who evaluate the PhD dissertations, will help the PhD candidates to perfect and give value to their final works.

An even more complicated matter appears to be that of the places to privilege to present the research results or their intermediate stages on both a national and international scale. As better articulate in other essays from this volume, there will be a need to fully understand and share those that for many are the new rules of the game.

Notes

1. LYNCH K., (1972), "*What Time Is This Place?*, The MIT Press, Cambridge, Massachusetts, USA, pag.232, ISBN 978-0-262-62032-1
2. Cfr. *Architectural Technology Policies (DM 4/10/2000).*
3. STEPHEN EMMITT, *School of Civil & Building Engineering, Loughborough University, UK.*
4. "*Architectural Technology is the constructive link between the abstract and the artefact. Without the technologies to realise the built form archi-*

tectural design would only exist in the abstract. The term 'architectural technology' is used quite widely in the construction sector, ranging from a rather general use to cover construction technology from an architectural perspective through to the specific use of the term to describe and define a profession.(…)" . Emmitt S., (2011), "*Technological design, in a multidisciplinary, sensory, context*", in TECNE n.02/2011, Firenze University Press, Florence, pag. 48, ISSN online: 2239-0243.

5. One of the of the founding fathers of the discipline that was professor emeritus of Technology of Architecture. Giuseppe Ciribini (1913-1990) See Ciribini G., (1984), "*Tecnologia e progetto: argomenti di cultura tecnologica della progettazione*", CELID, Torino. To study his complete works, see the recent volume: Bosia D. (edited by), (2013), "*L'opera di Giuseppe Ciribini*", series Reserach on architecture technology, Franco Angeli Editor, Milan, pages. 226, ISBN 978-88-204-4359-7.
6. GIALLOCOSTA G., (2011), "*Architectural Technology and Technologiacal Planning*", in Techne n.02/2011, Firenze University Press, Florence, pag.24, ISSN online:2239-0243.
7. CIRIBINI G., (1971), *"Una nuova tecnologia per l'ambiente costruito"*, in Baglioni Moretti A., Baracchi P., Bazzanella L., Ciribini G., Foti M., Pasquali E., Zaffagnini M., "*Il boomerang tecnologico*", extract from "Un pianeta da abitare requisiti e prestazioni per l'ambiente costruito", Ente Autonomo per le Fiere di Bologna, 7° SAIE, Bologna, 16-24 October 1971, pag. 19.
8. ZAFFAGNINI M., FOTI M., (1969), "*La sfida Elettronica. Realtà e prospettive dell'uso del computer in architettura.*", E.A. Fiere di Bologna, Bologna.
9. Extract from "Report of Mapping Exercise on Doctoral Training in Europe "*Towards a common approach*" of 27 June 2011 (final), adopted by the ERA Steering Group on Human Resources and Mobility. The Principles have been endorsed in the Council conclusions on the modernisation of higher education, Brussels, 28 and 29 November 2011. http://ec.europa.eu/euraxess/pdf/research_policies/Report_of_Mapping_Exercise_on_Doctoral_Training_FINAL.pdf
10. "*Transferable Skills Training: transferable skills are skills learned in one context (for example research) that are useful in another (for example future employment whether that is in research, business etc). They enable subject- and research-related skills to be applied and developed effectively. Transferable skills may be acquired through training or*

through work experience". Extract from *"Research Careers in Europe Landscape and Horizons", European Science Foundation 2010 http://www.esf.org/fileadmin/links/CEO/ResearchCareers_60p%20A4_13Jan.pdf*

11. LUCARELLI M.T., MUSSINELLI E., TROMBETTA C. (edited by), (2016), " *Cluster in Progress. The Architectural technology network for innovation*", Politecnica Series, Maggioli Editore, Rimini, Italy, (I edition), pagg. 420, ISBN 8891612496

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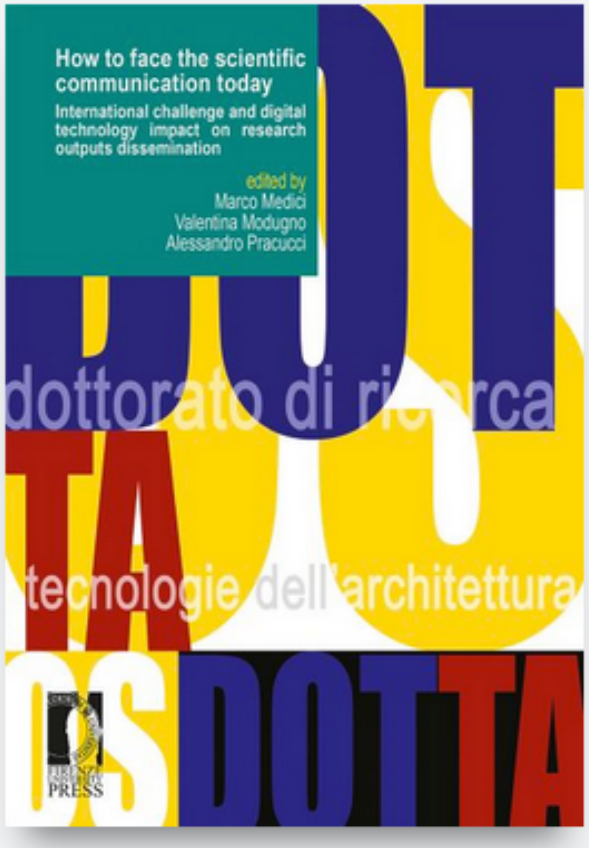

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