



Research Methods for Construction

Fourth Edition

Richard Fellows • Anita Liu

WILEY Blackwell

Research Methods for Construction

Fourth Edition

Richard Fellows

School of Civil and Building Engineering
Loughborough University
UK

Anita Liu

Department of Real Estate and Construction
The University of Hong Kong
Hongkong

WILEY Blackwell

This edition first published 2015

© 2015 by John Wiley & Sons, Ltd

Registered office:

John Wiley & Sons, Ltd, The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, United Kingdom.

Editorial office:

9600 Garsington Road, Oxford, OX4 2DQ, United Kingdom.

The Atrium, Southern Gate, Chichester, West Sussex, PO19 8SQ, United Kingdom.

For details of our global editorial offices, for customer services and for information about how to apply for permission to reuse the copyright material in this book please see our website at www.wiley.com/wiley-blackwell.

The right of the author to be identified as the author of this work has been asserted in accordance with the UK Copyright, Designs and Patents Act 1988.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, except as permitted by the UK Copyright, Designs and Patents Act 1988, without the prior permission of the publisher.

Designations used by companies to distinguish their products are often claimed as trademarks. All brand names and product names used in this book are trade names, service marks, trademarks or registered trademarks of their respective owners. The publisher is not associated with any product or vendor mentioned in this book.

Limit of Liability/Disclaimer of Warranty: While the publisher and author(s) have used their best efforts in preparing this book, they make no representations or warranties with respect to the accuracy or completeness of the contents of this book and specifically disclaim any implied warranties of merchantability or fitness for a particular purpose. It is sold on the understanding that the publisher is not engaged in rendering professional services and neither the publisher nor the author shall be liable for damages arising herefrom. If professional advice or other expert assistance is required, the services of a competent professional should be sought.

Library of Congress Cataloging-in-Publication Data

Fellows, Richard, 1948-

Research methods for construction / Richard Fellows, Department of Real Estate and Construction, The University of Hong Kong, and Anita Liu, Department of Civil and Building Engineering, Loughborough University. – Third edition.

pages cm

Includes bibliographical references and index.

ISBN 978-1-118-91574-5 (pbk.)

I. Building – Research – Methodology. I. Liu, Anita. II. Title.

TH213.5.F45 2015

624.072–dc23

2015008904

A catalogue record for this book is available from the British Library.

Wiley also publishes its books in a variety of electronic formats. Some content that appears in print may not be available in electronic books.

Set in 10/12pt TimesLTStd by SPi Global, Chennai, India

Printed in Singapore by C.O.S. Printers Pte Ltd

Contents

<i>About the Authors</i>	xi
<i>Preface</i>	xiii

PART I PRODUCING A PROPOSAL 1

1 Introduction 3

1.1	The concept of research	3
1.1.1	Research: a careful search/investigation	4
1.1.2	Research: contribution to knowledge	4
1.1.3	A learning process	5
1.1.4	Contextual factors affecting research	6
1.2	Classifications of research	7
1.2.1	Pure and applied research	7
1.2.2	Quantitative and qualitative research	8
1.2.3	Other categories of research	11
1.3	Theories and paradigms	12
1.3.1	Development of knowledge	13
1.3.2	Testing a theory	15
1.3.3	A paradigm	18
1.3.4	Positivism	19
1.3.5	Interpretivism	20
1.3.6	Models and hypotheses	22
1.4	Research styles	22
1.4.1	Action research	23
1.4.2	Ethnographic research	24
1.4.3	Surveys	25
1.4.4	Case studies	25
1.4.5	Experiments	27
1.5	Quantitative and qualitative approaches	28
1.5.1	Quantitative approaches	29
1.5.2	Qualitative approaches	29
1.5.3	Triangulated studies	29
1.5.4	Data sources	30
1.6	Where to begin	31
1.7	Summary	33

2 Topic for Study 37

2.1	Selection of a topic	37
2.1.1	Resources	37
2.1.2	Subject selection	39
2.1.3	Choosing a topic	41

2.1.4	Evaluating alternatives	42
2.1.5	Refining a topic	43
2.2	Writing the proposal	43
2.2.1	Aim	44
2.2.2	Proposition	45
2.2.3	Objectives	45
2.2.4	Hypotheses	46
2.2.5	Methodology and methods	48
2.2.6	Programme	50
2.2.7	Deliverables and industrial or practitioner support	50
2.3	Summary	51
PART II EXECUTING THE RESEARCH		53
3	Initial Research	55
3.1	The research process	55
3.1.1	Initial phase	58
3.1.2	Data and information	58
3.1.3	Dynamic process	60
3.2	Initial search	61
3.2.1	Definitions and assumptions	63
3.2.2	Theory and literature review	63
3.2.3	Analysing data from a search	64
3.3	Literature-based discovery	67
3.4	Assembling the theoretical framework	68
3.5	Philosophy and methodology	69
3.5.1	Ontology and epistemology	70
3.5.2	Positivism and phenomenology	71
3.5.3	Constructivism and reductionism	73
3.5.4	Realism	74
3.5.5	Fuzzy thinking	76
3.6	Theoretical models and constructs	76
3.6.1	What is modelling?	76
3.6.2	Theoretical model	77
3.6.3	Constructs	78
3.7	Proper referencing	81
3.8	Summary	82
4	Approaches to Empirical Work	86
4.1	Role of experience	86
4.1.1	When does research begin?	86
4.1.2	What is experience?	87

4.2	Research design	88
4.2.1	Context	89
4.2.2	Empiricism and verification	90
4.2.3	Deduction and induction	92
4.2.4	Case study	93
4.2.5	Ethnography	94
4.2.6	Experiments and quasi-experiments	95
4.2.7	Variance and errors	97
4.3	Qualitative approaches	98
4.3.1	When are qualitative approaches employed?	98
4.3.2	Development of theory from data	100
4.3.3	Analysis of data	102
4.4	Quantitative approaches	103
4.4.1	When are quantitative approaches employed?	103
4.4.2	Sources of data	104
4.4.3	Experimental control	107
4.5	Experimental design (including experiments and quasi-experiments)	108
4.5.1	Experiments and quasi-experiments	108
4.5.2	Variables	109
4.5.3	Replication	111
4.5.4	Between-subjects design (simple randomised experiments)	113
4.5.5	Between-subjects design (matched randomised groups)	113
4.5.6	Within-subject design (repeated measure design)	114
4.5.7	Factorial experiments	114
4.6	Case study research	114
4.7	Modelling	118
4.7.1	Classification of models	118
4.7.2	Deterministic and stochastic models	119
4.7.3	The modelling process	120
4.8	Simulation	121
4.8.1	Dynamism	121
4.8.2	Heuristics	122
4.8.3	Approaches	122
4.9	Level of research	124
4.10	Summary	126
5	Hypotheses	130
5.1	Essentials of a valid hypothesis	130
5.2	Roles of hypotheses	133
5.3	Objective testing of hypotheses	134
5.4	Role of sampling	136
5.5	Common statistical measures	137
5.5.1	Normal distribution	142
5.6	Null hypotheses	144
5.7	Validities	146
5.8	Summary	148

10.3.6	Presentation of results	285
10.3.7	Discussion of results	286
10.3.8	Conclusions	286
10.3.9	Limitations	287
10.3.10	Recommendations	287
10.3.11	Introduction	288
10.3.12	Remainder of the report	288
10.4	Oral presentation	289
10.5	Summary	290
<i>Index</i>		291

About the Authors

Professor Richard Fellows, Department of Civil and Building Engineering, Loughborough University

Richard Fellows is Professor of Construction Business Management at Loughborough University, United Kingdom; previously, he was a Professor in the Department of Real Estate and Construction, The University of Hong Kong, and Professor of Culture in Construction at Glasgow Caledonian University, United Kingdom. He graduated from the University of Aston and has worked as a quantity surveyor for several major contractors. Richard has a PhD from the University of Reading, has taught at a number of universities in the United Kingdom and other countries and was co-ordinator for research in construction management for the Engineering and Physical Sciences Research Council in the United Kingdom. His research interests concern economics, contracts and law and management of people in construction – especially, cultural issues as drivers of behaviour and performance. He was a founder and, for many years, was joint coordinator of the CIB group, W112 – ‘Culture in Construction’. Richard has published widely in books, journals and international conferences and is qualified as a mediator.

Professor Anita Liu, Department of Real Estate and Construction, University of Hong Kong

Anita Liu graduated from the University of Reading. She returned to Hong Kong to work in a quantity surveying consultancy, for the Hong Kong government, and for a major contractor before moving into academia. She obtained an MSc and a PhD from the University of Hong Kong. She has obtained many research grants from different awarding bodies, including ESRC (UK) and RGC (Hong Kong) projects, and has presented papers at many international research conferences. She publishes widely in a variety of leading journals, is a regular reviewer for international journals and research awarding bodies and is a member of several editorial boards. Anita has been chairperson of the Quantity Surveying Division of the Hong Kong Institute of Surveyors and a member of committees and boards in various professional institutions in China and in the United Kingdom. Anita was chair professor of Commercial Management and Quantity Surveying at Loughborough University. Currently, she is Professor in the Department of Real Estate and Construction at The University of Hong Kong and joint co-coordinator of CIB W112: ‘Culture in Construction’.

