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Alignment of business in robotic process automation

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Abstract

Purpose – This paper aims to find out how business aligns with robotic process automation (RPA) and whether the alignment has the same factors as for IT–business alignment.

Design/Methodology/Approach – Condition configurations for positive and negative impact for business alignment with RPA.

Findings – The positive and negative configurations that possibly impact business alignment with RPA.

Research limitations/implications – There are some human instincts during conditions dichotomization and limited number of cases.

Practical implications – The findings can be used to guide practice application in real industry.

Originality/value – This paper adopted crisp-set qualitative comparative analysis to find condition configurations for alignment of business and RPA for more generalization.

Keywords Robotic process automation, Crisp-set QCA (csQCA), IT–business alignment

Paper type Research paper

1. Introduction

With the development of science and technology, the automation technology, as the most possible way to replace human workers, has become mature. Robotic process automation (RPA) is a software robotic tool that can mimic human actions with computer systems to automate repetitive tasks (Oliveira, 2016). It is the most mature solution and has attracted enterprise managers' attention. Some studies have focused on the IT–business alignment that IT and business aligned into one whole together (Baker *et al.*, 2011; Sabegh and Motlagh, 2012). From these research studies, five possible key factors can be found: environmental shift, sustained low performance, influential outsiders, new leadership and perception transformation (Sabherwal *et al.*, 2001).

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How does business align with RPA? To answer this question and to summarize the RPA–business alignment key factors, this research is based on IT–business alignment theory and literatures to .

2. Literature review

2.1 Robotic process automation

RPA is a software robotic tool that automates routine tasks (Berruti, *et al.*, 2017; Oliveira, 2016). It is proved by scholars to be an effective way to cut costs (Hellström, 2016). Some studies have begun to explore the possible way to deploy it based on some real experiences.

RPA, as the replacement of human worker, can be deployed in many industry areas, for example, financial (Lacity *et al.*, 2017; Mary *et al.*, 2016), telecommunication (Lacity *et al.*, 2015a, 2015b), business process outsourcing (Lacity *et al.*, 2016a, 2016b), education (Herbert, 2016), banking (Willcocks *et al.*, 2017) and legal (Holder *et al.*, 2016). Most empirical studies have assessed the possible ways for and obstacles to RPA deployment in the real industry. These studies are based on case studies. From empirical studies, researchers can find the key factors that aligns business with RPA.

2.2 IT–business alignment

The definition of IT–business alignment is applying IT in an appropriate and timely manner to harmonize with business strategies, goals and needs. The alignment addresses both how IT is in harmony with business and how business should or could be in harmony with IT (Luftman, 2004). The famous IT–business alignment model – strategic alignment model (SAM) – includes four fundamental domains: business strategy, information technology strategy, organization infrastructure and process and information technology infrastructure and process (Henderson and Venkatraman, 1999). The SAM model consists of six dimensions, including communications, competency/value measurement, governance, partnership, scope and architecture and skills (Luftman, 2004; Luftman and Kempaiah, 2007).

There are two kinds of traditional IT–business alignment theories. One theory is that if IT and business are aligned, it can achieve the end-to-end close connection at strategic, organizational and operational levels (Baker *et al.*, 2011; Sabegh and Motlagh, 2012) to improve finance performance and catch competency advantage. The other theory is IT–business alignment needs more investment for reconstruction in infrastructure, organization and business process reengineering. If IT–business alignment is a failure, the IT initiatives will also be failure (Ravishankar *et al.*, 2011) and will impact business performance (Chan *et al.*, 1997). Even if there is "the alignment paradox" that better IT alignment cannot lead to business gains because of a too inflexible IT backbone (Tallon, 2003).

The latest studies are based on a punctuated equilibrium theory that recognizes that alignment is not a static event but a process of continuous adaption and adoption (Sabherwal *et al.*, 2001). There are five possible antecedents of revolutionary change: environmental shift, sustained low performance, influential outsiders, new leadership and perception transformation. In another research result, two more antecedents were added: government support and organizational inertia (Wang *et al.*, 2011).

2.3 Literature review summary

From review result, the existing RPA literatures are based on case studies or concept explorations that have special backgrounds and these studies lack generalizations. This

research aims to find out the key factors for business–RPA alignment in generality and whether they are the same key factors for IT–business alignment.

3. Empirical study

3.1 Research method

Qualitative comparative analysis (QCA) is a methodology for obtaining summarizations from cases. This based on set-theoretical logics method can characterize through causal asymmetry and well applicability of small-N sample sizes because causal conditions or combination conditions can lead to an equifinality (Ragin, 2014; Fiss, 2007).

There are three types of QCA: crisp-set QCA (csQCA) (Ragin, 2014), fuzzy-set QCA (fsQCA) (Ragin, 2009) and multi-value QCA (mvQCA) (Berg-Schlosser and Cronqvist, 2005). The csQCA handles the variable as "0" or "1" dichotomous variable and allows researchers to directly compare statistical techniques to better. The fsQCA is an extension of csQCA, which investigates how causal relationships are dependent on non-contextual conditions, and is more closed to statistical approaches. It provides a flexible tie between qualitative and quantitative characteristics because of variables that show a continuous degree of "belonging" or "membership." A fuzzy-set variable changes continuously in a 0-1 closed interval. The mvQCA is another extension of csQCA. It allows some explanatory conditions to have more than two values and can be viewed as the middle-way between csQCA and fsQCA.

QCA can bridge the gap between qualitative and quantitative approaches with small-N cases support. This research will use the csQCA method to identify whether antecedents are the same key factors for the RPA-business with IT-business history researches.

3.2 Data source

For this research, the data sources are the literatures and RPA websites. First, by searching Google Scholar with the keywords "Robotic Process Automation" from 2015 to present with English or Chinese language, there are total 263 studies. Then searching public website with the keywords "Robotic Process Automation" from the year 2015 to present also. After a full review, there were 21 companies to be studied, as shown in Table I.

3.3 Conditions definition and dichotomization

The first step of the QCA method is antecedent definition by the inductive or deductive approach (Ketchen *et al.*, 1993). For this research, the deductive approach is applied. By reviewing literatures about the IT–business alignment, five possible antecedents of revolutionary change were found: environmental shift, sustained low performance, influential outsiders, new leadership and perception transformation (Sabherwal *et al.*, 2001). There are two more antecedents, government support and organizational inertia, that may impact IT–business alignment (Wang *et al.*, 2011), as shown in Table II. The next step is the condition setting or dichotomization, as can be seen in Table III.

3.4 Outcome definition and dichotomization

Delphi as a qualitative method is suitable for achieving consensus from a panel of consultants to address the maturity level. The same evaluation procedure is used to find business alignment with RPA maturity level (Assessing Business-IT Alignment Maturity,

Reference topic	Object company	Author or source
RPA at Xchanging	Xchanging	Willcocks *et al.*, 2015
Robotizing global financial shared services at Royal DSM	Royal DSM	Lacity *et al.*, 2016a, 2016b
Service automation: cognitive virtual agents at SEB Bank	SEB bank	Lacity *et al.*, 2016a, 2016b
Turning RPA into commercial success: case OpusCapita	OpusCapita Group	Annu *et al.*, 2016
Rethinking legal services in the face of globalization and technology innovation: the case of Radiant Law	Radiant Law	Lacity *et al.*, 2016a, 2016b
RPA at Telefónica O2	Telefónica O2	Lacity *et al.*, 2015a, 2015b
Employing US military families to provide business process outsourcing services: a case study of impact sourcing and reshoring	Liberty Source	Lacity *et al.*, 2016a, 2016b
RPA: mature capabilities in the energy sector	European energy supplier	Lacity *et al.*, 2015a, 2015b
Vodafone Shared Services: exploring RPA opportunities	Vodafone Shared Services (VSS)	Salvatore, 2016
RPA for real: Ascension Health takes on leading role	Ascension Health	Hanna, 2016
The rise of robots	BNY Mellon	BNY MELLON, 2017
Strategy symposium of SINOCHEM Group was held	SINOCHEM	Sinochem Group, 2016
Davies Turner transforms customer service with real-time insight into shipments and inventory	Davies Turner	KOFAX, 2017a, 2017b
Union Bank accelerates time to revenue for mortgage loans	MUFG Union Bank	KOFAX, 2017a, 2017b
Your biggest pain points: speed of change	Leeds Building Society	Mowlesy, 2016
RPA enables 100% process efficiency and 45% cost reduction in AP for global plastic manufacturer	Coveris Holdings Sarl	Auxis, 2017
Wipro's success through hyper automation	Wipro limited	Obtv-admin, 2016
Global convenience: Jacob Schram	Circle K	CEO Magazine, 2017
Accenture and Blue Prism team to provide RPA to help clients accelerate business results, improve employee and customer experience	Raifessen Bank International	Accenture, 2017
Rise of the machines as ANZ brings in robot workers to do the 'boring' jobs	ANZ Bank	Smith, 2015
DBS Bank accelerates digitalisation transformation with robotics program	DBS Bank	DBS, 2017

Table I.
RPA adoption reference cases

	Conditions	Labels for conditions
Conditions	Environmental shift	ENVSHI
	Sustained low performance	LOWPER
	Influential outside	INFOUT
	New leadership	NWLDER
	Perception transformation	PERTRA
	*Organizational inertia	*ORGINE
Outcome	RPA-business alignment	RBALIG

Table II.
RPA–business conditions form

2000). Two IT consultants with 15 years of experiences each in the enterprise IT field evaluated the alignment level with an average result . The outcome (RPA–business alignment [RBALIG]) set 1 when the level is above level 2, otherwise the outcome (RBALIG) set 0 in Table IV.

3.5 Calculation procedure

Every case is equally important for theory exploration. There will be contradiction configuration in certain situations. Researchers need a base on the real cases to

Table III. RPA–business conditions dichotomization threshold

Conditions	Threshold of the condition dichotomization
ENVSHI	Environment or business strategy change = >1, else 0
LOWPER	Shrink market share or reduced profits = >1, else 0
INFOUT	Macro-environment change or policy change > 1, else 0
NWLDER	Leadership or report process change = >1, else 0
PERTRA	Realize the digital transformation = >1, else 0
*ORGINE	The barrier to organization change = >1, else 0
RBALIG	IT–business maturity level above level 2 => 1, else 0

Table IV. RPA–business alignment maturity evaluation result

Communications	Competency/ value measurement	Governance	Partnership	Scope and architecture	Skills	Maturity level	Outcome (RBALIG)
3	2	2	3	4	4	3	1
4	2	3	3	4	3	3	1
3	3	3	2	3	2	3	1
3	2	2	1	1	2	2	0
3	3	4	2	3	3	3	1
3	3	4	3	3	3	3	1
3	2	2	4	4	3	3	1
2	2	3	2	2	1	2	0
3	2	3	4	3	3	3	1
2	1	2	1	1	2	2	0
3	3	3	3	3	2	3	1
2	1	3	2	2	1	2	0
3	2	4	3	3	3	3	1
3	3	3	3	2	4	3	1
2	2	4	3	4	4	3	1
2	2	4	4	3	3	3	1
3	3	2	2	3	4	3	1
2	4	3	3	2	3	3	1
3	3	3	3	2	4	3	1
3	3	4	3	3	2	3	1
3	3	4	3	3	2	3	1

Notes: 1: Xchanging; 2: Royal DSM; 3: SEB Bank; 4: OpusCapita; 5: Radiant Law; 6: Telefónica O2; 7: Liberty Source; 8: UTILITY; 9: Vodafone Shared Service; 10: Ascension Health; 11: Mellon Bank; 12: SINOCHEM; 13: Davies Turner; 14: MUGF Union Bank; 15: Leeds Building Society; 16: Coveris Holdings Sarl; 17: Wipro; 18: Circle K; 19: Raifessen Bank; 20: ANZ; 21: DBS

summarize the generalization with previous results to resolve the contradiction (Ragin, 2014; Fiss, 2007). The environment condition and outside have some overlap, for example, the business strategy shift maybe impact some outsider factors. So, the condition influential outsiders (INFOUT) can be replaced by organization inertia (ORGIN), as shown in Table V.

With the help of TOSMANA 1.5 software, the csQCA calculation finds the conditions combination that can drive business alignment with RPA and solve the contradiction. Finally, there are 11 configurations, as can be seen in Table VI.

4. Conclusion

4.1 Positive result

To minimize with tools, there are two possible configurations that may prompt business alignment with RPA (Table VII):

First, the new enterprise strategy with new leadership that has a digital-transformation perception can prompt RPA–business alignment. Managers realize the digital prompt enabler to the enterprises, they will make the alignment quicker and better.

Second, low performance with stable leadership that has a digital-transformation perception can also prompt RPA–business alignment. When financial results or market shares are down, the leadership will think about the future and a method that can improve this. If the managers also have a digital view and transformation perception, business alignment with RPA can be prompted.

Case ID	ENVSHI	LOWPER	ORGIN	NWLDER	PERTRA	RBALIG
1	1	0	0	1	1	1
2	1	0	1	0	1	1
3	0	0	1	0	1	1
4	1	1	1	0	1	0
5	0	0	1	0	1	1
6	1	1	0	1	1	1
7	1	0	0	1	1	1
8	1	1	1	0	1	0
9	0	0	1	0	1	1
10	1	0	0	0	1	0
11	1	1	1	1	1	1
12	0	0	1	0	0	0
13	0	0	1	0	1	1
14	0	0	1	0	1	1
15	0	0	1	0	1	1
16	1	0	0	1	1	1
17	1	0	1	1	1	1
18	0	0	0	0	1	1
19	1	0	1	1	1	1
20	1	1	1	1	1	1
21	1	0	1	0	1	1

Notes: 1: Xchanging; 2: Royal DSM; 3:SEB Bank; 4: OpusCapita; 5: Radiant Law; 6: Telefónica O2; 7: Liberty Source; 8: UTILITY; 9: Vodafone Shared Service; 10: Ascension Health; 11: Mellon Bank; 12: SINOCHEM; 13: Davies Turner; 14: MUGF Union Bank; 15: Leeds Building Society; 16: Coveris Holdings Sarl; 17: Wipro; 18: Circle K; 19: Raifessen Bank; 20: ANZ; 21: DBS

Table V.
True table for RPA–business alignment after condition replacement

4.2 Negative result

To minimize with tools, there are three possible configurations that may slow down business alignment with RPA (Table VIII):

First, digital-transformation perception can be a negative factor that can slow RPA–business alignment; enterprises do not realize the power of digital transformation for revolutionizing industries. There are many facts to prove this.

Second, when an enterprise's financial performance or market share is down, even if there is stable leadership, RPA–business alignment can slow down because managers' first priority would be to improve performance. Business is the root of an enterprise.

Third, a business strategy adjustment with stable leadership and small organization inertia may also slow down RPA–business alignment. The enterprise/organization strategy orients operations daily. The strategy change is at a high level so that it may result into some turbulence for the enterprise/enterprise. Finally, it will slow RPA–business alignment.

Case ID	ENVSHI	LOWPER	ORGIN	NWLDER	PERTRA	RBALIG
18	0	0	0	0	1	1
12	0	0	1	0	0	0
3,5,9,13,14,15	0	0	1	0	1	1
10	0	0	0	0	1	0
1,7,16	1	0	0	1	1	1
2,21	1	0	1	0	1	1
17,19	1	0	1	1	1	1
6	1	1	0	1	1	1
4,8	1	1	1	0	1	0
11,20	1	1	1	1	1	1

Table VI. Configurations true table without contradiction

Notes: 1: Xchanging; 2: Royal DSM; 3: SEB Bank; 4: OpusCapita; 5: Radiant Law; 6: Telefónica O2; 7: Liberty Source; 8: UTILITY; 9: Vodafone Shared Service; 10: Ascension Health; 11: Mellon Bank; 12: SINOCHEM; 13: Davies Turner; 14: MUGF Union Bank; 15: Leeds Building Society; 16: Coveris Holdings Sarl; 17: Wipro; 18: Circle K; 19: Raifessen Bank; 20: ANZ; 21: DBS

ENVSHI{1} * NWLDER{1} * PERTRA{1} +	LOWPER{0} * NWLDER{0} * PERTRA{1}
(Xchanging, US Military, Coveris Holdings + Telefónica O2 + Mellon, ANZ + Wipro, Raifessen Bank)	(Royal DSM, DBS + SEB Bank, Radiant Law, Vodafone, Davies Turner, MUFG Union Bank, Leeds + Circle K)

Table VII. Configurations true table without contradiction

Note: Minimizing: 1 Including: 0 C

PERTRA{0} +	LOWPER{1} NWLDER{0} +	NVSHI{1} ORGIN{0} NWLDER{0}
(SINOCHEM)	(OpusCapita, Big European energy)	(Ascension)

Table VIII. Configurations true table without contradiction

Note: Minimizing: 0 Including: R

5. Future research

RPA aligns with business to make enterprises achieve more productivity and better quality. By adopting RPA, organizations will enjoy a "Triple win" from automation (Fig 2): a win for customer, a win for employees and a win for stakeholders. Finally, RPA–business alignment can definitely improve business performance.

Future research on RPA implications can be from the perspective of the customer or stakeholder or business performance.

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