



# The positive mutually reinforcing dynamics of career-adaptive attributes in career human agency



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**Background:** Empirical research on career-adaptive attributes that elucidate the dynamic interplay between resources of career self-reactiveness and career self-reflectiveness in career human agency theory (CHAT) is scant.

**Objectives:** The objective of the study was to assess the simultaneous interplay between constructs of career self-reactiveness (career adaptability, psychological capital, career agility) and constructs of career self-reflectiveness (career resilience and career satisfaction).

**Methods:** The cross-sectional canonical correlational design of the study involved a random sample of black African employees ( $N = 412$ ) in a South African public service government organisation.

**Results:** Adaptive readiness, goal-directed adaptability and career forethought and intentionality in goal achievement emerged as four common synthetic themes that illustrated the mutually reinforcing dynamics among the study variables.

**Conclusion:** The reciprocal associations among the study variables offer promising support for career counselling interventions that apply the CHAT. The findings may guide the use of career assessments for career-adaptive behaviours that help cultivate career human agency.

**Contribution:** The study contributed to career development in the African context by enriching understanding of the role of individuals' adaptive readiness, goal-directed adaptability, career forethought and career intentionality in agentic career goal achievement.

**Keywords:** career adaptability; career agility; career human agency; career resilience; career satisfaction; psychological capital.

## Introduction

The increased instability and unpredictability of the contemporary career landscape caused a heightened demand for human agency in career construction (Chen & Hong, 2020a; Nalis et al., 2022). Lifelong learning and career-adaptive attributes are essential resources of human agency; such attributes help individuals respond to and cope with continuous and rapid changes in the work world (Chen & Hong, 2020a, 2020b; Nilforooshan, 2020; Öztemel & Akyol, 2021). Some of these changes allude to the rise of boundaryless careers, virtual and contingent work, temporary job positions, time-limited projects and frequent job transitions (Coetzee et al., 2022a; Zhu et al., 2019). Career human agency is about adapting, self-regulating and facing challenges to achieve career goals despite adversity (Chen & Hong, 2020a, 2020b). Individuals exhibit a psychological resource set that enables them to intentionally navigate changing conditions in the pursuit of career goals. Individuals can negotiate alternative paths to achieve desirable goals when obstacles hinder plans (Chen & Hong, 2020a; Luthans & Youssef-Morgan, 2017). Human agency in career adaptation has been associated with job search self-efficacy, career success, satisfaction and proactive career behaviours such as career planning, exploration and skill development (Guan et al., 2013; Johnston, 2018; Nilforooshan, 2020; Zacher, 2014).

The present study draws from career human agency theory (CHAT: Chen & Hong, 2020a, 2020b) as theoretical lens. The aim of this study was to assess the reciprocal interconnectedness between career adaptive attributes associated with two pillars of career human agency, namely career self-reactiveness and career self-reflectiveness.

*Career self-reactiveness* alludes to the self-regulated ability to proactively and intentionally adapt to and cope with fortuitous career-life events and circumstances (Chen & Hong, 2020a, 2020b). On the other hand, *career self-reflectiveness* denotes a confluence of individual career behaviour, the

external environment and individuals' work world knowledge. Individuals appraise contextual influences on their career success in the light of their personal career needs, goals, values, interests, beliefs and efficacy, including interpersonal situations (Chen & Hong, 2020a). Savickas (2016) explains that reflexivity fosters agency within the self-awareness that emerges from self-reflectiveness. Self-awareness flows into intentional (self-reactiveness) career adaptive behaviours.

Career human agency theory (Chen & Hong, 2020a, 2020b) posits a simultaneous dynamic interaction between the pillars of career self-reactiveness and career self-reflectiveness. Both these two pillars of career human agency are in interplay with individuals' career intentionality (i.e. consciously formed career plans and actions) and career forethought (i.e. career self-efficacy in goalsetting and outcome expectations: Chen & Hong, 2020a).

Chen and Hong (2020a) highlight curiosity, flexibility, optimism and risk-taking as general skills and attitudes of career self-reactiveness including work world and self-knowledge as attributes of career self-reflectiveness. Attributes of career self-reactiveness enable individuals to stay motivated and follow through on goals and plans in the face of unpredictability. Attributes of career self-reflectiveness help individuals gauge career outcomes in the light of contextual influences that may hinder success (Amundson, 2005; Bandura, 2006; Chen & Hong, 2020a). However, empirical research on career-adaptive attributes that elucidate the CHAT description of career self-reactiveness and career self-reflectiveness is scant.

The present research fills this gap in research by assessing the simultaneous, mutually reinforcing correspondence between attributes of career self-reactiveness (career adaptability, psychological capital, career agility) and attributes of career self-reflectiveness (career resilience and career satisfaction). These study constructs are known to incorporate psychosocial career resources that help clients enact proactive agency in the modern-day work world (Coetzee, 2022; Han et al., 2021; Johnston, 2018; Klehe et al., 2021; Luthans & Youssef-Morgan, 2017; Matsuo, 2022; Öztemel & Akyol, 2021; Peeters et al., 2022; Spurk et al., 2015).

The findings may enrich the CHAT (Chen & Hong, 2020a, 2020b) by empirically demonstrating the reciprocal link between career adaptive attributes of career self-reactiveness and career self-reflectiveness in career human agency. The findings may potentially inform career counselling interventions focused on raising individuals' agency in career adaptability. Clients may gain a deeper understanding of how their career self-reflectiveness (career resilience and career satisfaction) influences their intentional use and development of career self-reactiveness resources (career adaptability, psychological capital and career agility) and vice versa. This awareness may help clients to develop and confidently apply the career resources they need for career success in changing work contexts.

## Career-adaptive attributes of career self-reactiveness

In the present study, the constructs of career adaptability, psychological capital and career agility denote a composite set of psychological resources that collectively reflect career-adaptive attributes of career self-reactiveness (i.e. proactive and intentional self-regulation in adapting to and coping with fortuitous career-life events and circumstances: Chen & Hong, 2020a).

*Career adaptability* comprises: (1) individuals' motivation to prepare for the future through career planning (career concern), (2) agency in one's career development and decidedness (career control), (3) envisioning and exploring future work selves (career curiosity) and (4) self-efficacy in solving unfamiliar and complex problems to achieve goals (career confidence: Klehe et al., 2021; Savickas & Porfeli, 2012; Tokar et al., 2020).

*Psychological capital* (PsyCap) constitutes individuals' self-efficacy, hope, resiliency and optimism (Luthans & Youssef-Morgan, 2017). These PsyCap attributes synergistically facilitate the positive appraisal of circumstances and the likelihood of succeeding in a situation (Baluku et al., 2020). Individuals are intrinsically confident and motivated to take action to succeed (self-efficacy); they exhibit goal-directed, agentic motivation and perseverance to succeed despite circumstances (hope); they can adapt to changing demands and bounce back from adversity, uncertainty, risk or failure (resiliency) and they have positive expectancies that they will achieve their goals despite adverse situations (optimism: Del Castillo & Lopez-Zafra, 2022; Luthans et al., 2007; Luthans & Youssef-Morgan, 2017).

*Career agility* reflects: (1) individuals' flexibility and optimism towards accelerated technological development that is perceived to bring new job and career opportunities for career growth (technological adaptivity); (2) an eagerness to search for opportunities to learn new skills that will improve career and job success (agile learning) and (3) a willingness to navigate the environment for new career opportunities, take advantage of and remain informed of changes and opportunities in the technology-driven job market (career navigation: Coetzee et al., 2021).

Research provides evidence of the distinctiveness of and dynamic interplay between career agility (adaptive readiness or willingness to proactively adapt to changes in the technology-driven career and job environment) and career adaptability (self-regulatory, psychosocial career resources that help individuals cope with current, unpredictable and anticipated changes in the life-career: Coetzee et al., 2020; Johnston, 2018; Klehe et al., 2021). PsyCap resources are known to enhance individuals' sense of control and intentionality in developing adaptability strategies for agentic goal pursuit in changing contexts (Baluku et al., 2020; Del Castillo & Lopez-Zafra, 2022; Luthans & Youssef-Morgan, 2017).

## Career-adaptive attributes of career self-reflectiveness

In the present study, the constructs of career resilience and career satisfaction stand for a composite set of psychological resources that collectively reflect attributes of career self-reflectiveness (i.e. confluent appraisal of contextual influences on personal career success in the light of one's career needs, goals, values, interests, beliefs and efficacy, including interpersonal situations: Chen & Hong, 2020a).

*Career resilience* reflects the confident appraised integration and alignment of inner career needs and outer opportunities for career advancement and success in changing work circumstances. The confluent appraisal involves the agentic persisting, adapting and thriving in one's career despite changing work conditions and disruptions over time (Han et al., 2021; Peeters et al., 2022; Tokar et al., 2020). Individuals reflect on: (1) their self-efficacious agentic adaptation to job changes and the extent to which they seize opportunities for new skills development and career goals for their future working life (self-reliance); (2) the extent to which they proactively adjust career and skills development goals in response to changes in the company's structure and strategy (personal resilience) and (3) the extent to which they proactively embrace turbulent changing technological and work conditions as an investment in their career growth (work resilience: Coetzee et al., 2015).

*Career satisfaction* denotes individuals' reflection on the degree of career success they have achieved, and their progress towards meeting overall career goals for advancement, income and skills development (Greenhaus et al., 1990; Matsuo, 2022; Spurk et al., 2015).

Both career resilience and career satisfaction reflect an agentic mode of optimal functioning denoted by individuals' positive appraisal of their careers in a work context. Research further indicates positive associations between psychological career resources, career resilience, career success and career satisfaction (Coetzee et al., 2022b; Han et al., 2021; Peeters et al., 2022).

Drawing from the basic premises of CHAT (Chen & Hong, 2020a, 2020b), it was assumed that the attributes of career adaptability, PsyCap and career agility function as a collective set of career self-reactiveness resources that reinforce individuals' career resilience and career satisfaction as a collective set of career self-reactiveness resources, and vice versa. In line with CHAT (Chen & Hong, 2020a), individuals leverage the resources of career self-reactiveness and career self-reflectiveness in a mutually reinforcing way; proactive, agentic career-adaptive behaviours are fostered as a result. To this end, confirmation of the following research hypothesis was expected:

**Hypothesis 1:** Individuals' career adaptability, PsyCap and career agility (i.e. attributes of career self-reactiveness) positively

correspond with their career resilience and career satisfaction (i.e. attributes of career self-reflectiveness), and vice versa.

## Research methods and design

### Participants

A random sample of ( $N = 412$ ) black African employees in a South African public service government organisation participated in the study. The sample comprised women (54%) and men (46%) in staff (70%) and departmental managerial (30%) level jobs. Most of the participants had up to 10 years (66%) and more than 10 years (34%) of job experience. The mean age of the participants was 38.79 years (standard deviation [SD] = 9.68).

### Measures

#### Career adaptability

Participants' career adaptability was measured by the 24-item career adaptabilities scale (CAAS) (Savickas & Porfeli, 2012). The CAAS measures four facets of career adaptability on a five-point Likert-type scale (1 = not strong; 5 = strongest): career concern (6 items; e.g. 'Planning how to achieve my goals'); career control (6 items; e.g. 'Making decisions by myself'); career curiosity (6 items; e.g. 'Investigating options before making a choice') and career confidence (6 items; e.g. 'Solving problems'). The CAAS has acceptable internal consistency reliability and construct validity in the South African organisational context (Coetzee et al., 2020).

#### Psychological capital

Participants' psychological capital was measured by the 24-item psychological capital questionnaire (PCQ-24) (Luthans et al., 2007). The PCQ measures four facets on a six-point Likert-type scale (1 = strongly disagree; 6 = strongly agree): self-efficacy (6 items; e.g. 'I feel confident analysing a long-term problem to find a solution'); hope (6 items; e.g. 'At the present time, I am energetically pursuing my work goals'); resiliency (5 items; e.g. 'When I have a setback at work, I have trouble recovering from it and moving on') and optimism (7 items: 'I always look on the bright side of things regarding my job'). The PCQ has acceptable internal consistency reliability and construct validity for the African organisational context (Baluku et al., 2020).

#### Career agility

Participants' career agility was measured by the 18-item career agility scale (CAS) (Coetzee et al., 2021). The three CAS facets were measured on a seven-point Likert-type scale (1 = strongly disagree; 7 = strongly agree): technological adaptivity (7 items; e.g. 'I search for job roles that evolve with changing technological conditions because they offer opportunities for growth and creativity'); agile learning (5 items, e.g. 'I feel it is important to search for new and better growth opportunities') and career navigation (6 items, e.g. 'I regularly scan the environment for new career opportunities'). The CAS has acceptable consistency reliability and construct validity in the South African organisational context (Coetzee et al., 2021).

### Career resilience

Participants' career resilience was measured by the 15-items adapted version of the career resilience questionnaire (CRQ) (Mogale, 2015). The three CRQ facets were measured on a seven-point Likert-type scale (1 = strongly disagree; 7 = strongly agree): self-reliance (5 items: e.g. 'Continuous improvement in one's job skills by engaging in development opportunities offered by one's employer is important to me'; personal resilience (4 items; e.g. 'Frequent changes in work assignments are worthwhile opportunities for career growth') and work resilience (6 items, e.g. 'I feel comfortable having to learn new technology every six months'). The CRQ has good internal consistency reliability and construct validity in the South African Public Service context (Coetzee et al., 2015).

### Career satisfaction

The five-item career satisfaction scale (CSS) (Greenhaus et al., 1990) measured participants' career satisfaction as a global construct on a seven-point Likert-type scale (1 = strongly disagree; 7 = strongly agree). Examples of items included: 'I am satisfied with the progress I have made towards meeting my goals for the development of new skills'; 'I am satisfied with the success I have achieved in my career'. The CSS has proven internal consistency reliability in the South African organisational context (Coetzee et al., 2022b).

### Procedure

Random sampling involved calculating the required sample size from the total population by using the Qualtrics (2023) online calculator (95% confidence level; 5% margin error; 0.50 SD; required sample size = 412). After assigning a random sequential number to each participant in the population, the Microsoft Office's Excel spreadsheet application's RAND formula assisted in generating a random number from the total population for the final selected sample. The main researcher invited participants via the company's intra-email system to voluntarily complete the research questionnaire. Participants received a no-reply URL link to the research questionnaire. The lime survey facilities of the research institution were utilised for the URL link.

### Ethical considerations

Ethical clearance for the study was obtained from the research institution (ERC Ref: 2020\_CEMS\_IOP\_033). Permission for the study was provided by the management of the organisation. Completion of the questionnaire was voluntary, anonymous and confidential. The participants gave informed consent that the data may be used for research purposes.

### Data analysis

Descriptive and bivariate correlation statistics were performed with the IBM Corp (2021) SPSS Statistics version 28.0 software package. A multifactor confirmatory factor analysis (CFA) with the maximum likelihood robust (MLR) estimator was conducted with the JASP (2022) computer software package to assess the distinctiveness of each of the

15 construct variables measured by the CAAS, PCQ, CAS, CRQ and CSS. In line with guidelines of Hair et al. (2019), the following rules of thumb (threshold values) were applied for good model fit and construct validity: chi-square/ $df \leq 3$ ; root mean square error of approximation (RMSEA)  $\leq 0.06$  or  $\leq 0.08$ ; standardised root mean squared residual (SRMR)  $\leq 0.05$ ; comparative fit index (CFI)  $\geq 0.90$ . Canonical correlation analysis (CCA) was performed with the SAS (2013) software program to calculate a multivariate statistical model that assessed the co-relationship between two sets of latent variables that each comprised multiple variables. Canonical correlation analysis allowed for exploring what is common among two sets of canonical variate variables as well as which variables contributed the most in explaining the links between the two sets of variables (Guarino, 2004). The Wilk's multivariate criterion lambda ( $\lambda$ ) was used to assess the practical significance ( $1 - \lambda = r^2$ -type metric of effect size) of the full canonical model (Sherry & Henson, 2005).

## Results

### Preliminary statistics

The multifactor CFA had good model fit that pointed to the distinctiveness of the 15 construct variables and minimised concerns about multicollinearity: chi-square = 5651;  $df = 2996$ ; chi-square/ $df = 1.89$ ;  $p < 0.001$ ; RMSEA = 0.048 (90% confidence interval [CI] upper bound); SRMR = 0.048; CFI = 0.90. As per the guidelines of Rönkkö and Cho (2022) for assessing discriminant validity, the CFA paired factor co-variances were inspected. All estimates were positive and the upper confidence limit intervals (UCLIs) were all below 0.80 (see Table 1-A1). These estimates indicated evidence of acceptable discriminant validity between the construct variables. Table 1 shows that the construct scales had acceptable (0.69) to high (0.94) internal consistency reliability. The construct variables had significant and positive associations at  $p \leq 0.000$  ( $r \geq 0.24$  to  $r \leq 0.61$ ; small to large practical effect). All correlations were below  $< 0.80$  and diminished concerns about potential multicollinearity.

### Canonical correlation analysis

Table 2 shows that the full canonical model was statistically significant across four dimensions (functions). The Wilks' Lambda statistic ( $\lambda$ ) of 0.27,  $F = 13.98$ ,  $p \leq 0.0001$  had a  $r^2$  metric ( $1 - \lambda$  [ $1 - 0.27$ ]) effect size of 0.73 (large practical effect). The canonical correlation of the first function was 0.81 and it already contributed a substantial proportion ( $R_c^2 = 0.66$ : 66%) of the variance shared between the two sets of canonical variate variables. The first function was therefore regarded as being practically the most relevant for interpreting the links between the two sets of variables.

Table 3 shows the structure coefficients for the first canonical variate explaining which variables contribute most to each composite set of variables. The three career agility variables ( $r_c \geq 0.83 - 0.95$ ; large practical effect) had the greatest influence in positively explaining the career self-reactiveness

**TABLE 1:** Descriptive statistics and bivariate correlations.

Variable	Cronbach's $\alpha$	CR	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Career concern	0.90	0.90	4.16	0.75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2. Career control	0.91	0.91	4.18	0.69	0.69	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3. Career curiosity	0.90	0.90	4.12	0.70	0.67	0.71	-	-	-	-	-	-	-	-	-	-	-	-	-
4. Career confidence	0.92	0.92	4.20	0.69	0.59	0.71	0.72	-	-	-	-	-	-	-	-	-	-	-	-
5. Self-efficacy	0.81	0.81	5.04	0.64	0.36	0.42	0.40	0.41	-	-	-	-	-	-	-	-	-	-	-
6. Hope	0.81	0.81	4.99	0.69	0.47	0.47	0.45	0.51	0.59	-	-	-	-	-	-	-	-	-	-
7. Resiliency	0.63	0.70	4.69	0.72	0.36	0.39	0.39	0.41	0.43	0.55	-	-	-	-	-	-	-	-	-
8. Optimism	0.69	0.69	4.93	0.55	0.43	0.44	0.44	0.46	0.44	0.57	0.49	-	-	-	-	-	-	-	-
9. Technological adaptivity	0.90	0.89	5.55	1.01	0.56	0.61	0.66	0.64	0.44	0.54	0.42	0.52	-	-	-	-	-	-	-
10. Agile learning	0.91	0.91	5.92	0.98	0.60	0.59	0.63	0.63	0.45	0.53	0.43	0.49	0.71	-	-	-	-	-	-
11. Career navigation	0.91	0.90	5.80	0.95	0.52	0.56	0.60	0.58	0.42	0.49	0.39	0.49	0.70	0.73	-	-	-	-	-
12. Self-reliance	0.83	0.83	5.74	0.93	0.49	0.52	0.54	0.52	0.43	0.45	0.38	0.42	0.63	0.61	0.70	-	-	-	-
13. Personal resilience	0.73	0.73	5.56	1.02	0.38	0.42	0.44	0.42	0.26	0.42	0.35	0.42	0.51	0.51	0.61	0.63	-	-	-
14. Work resilience	0.88	0.88	5.77	0.92	0.45	0.50	0.51	0.51	0.42	0.50	0.43	0.50	0.61	0.57	0.69	0.69	0.70	-	-
15. Career satisfaction	0.94	0.94	4.90	1.50	0.24	0.26	0.30	0.27	0.29	0.43	0.23	0.42	0.42	0.35	0.40	0.38	0.44	0.44	-

Note: All correlations were  $p < 0.0001$ .  
SD, standard deviation; CR, composite reliability.

**TABLE 2:** Canonical correlation, eigenvalues, multivariate statistics and F approximation.

Canonical function	Adjusted canonical correlation ( $r_c$ )	Approximate SE	Squared canonical correlation ( $Rc^2$ )	Eigenvalue	Wilks' Lambda statistic	F	p
1	0.81	0.02	0.66	1.94	0.27	13.98	< 0.0001
2	0.33	0.04	0.14	0.16	-	3.07	< 0.0001
3	0.19	0.05	0.06	0.06	-	1.72	0.03
4	0.09	0.05	0.02	0.02	-	0.97	0.46

SE, standard error.

**TABLE 3:** Canonical function 1: Canonical correlation structure analysis.

Career self-reactiveness	Correlations between variables and their related canonical variates†	Correlations between variables and the other set of canonical variate variables‡	Squared canonical cross-loadings ( $r_c^2$ )
<b>Canonical variate <math>V_1</math> variables</b>			
Career concern	0.66	0.54	0.29
Career control	0.69	0.56	0.32
Career curiosity	0.73	0.59	0.35
Career confidence	0.71	0.57	0.33
Self-efficacy	0.57	0.46	0.21
Hope	0.71	0.58	0.33
Resiliency	0.51	0.41	0.17
Optimism	0.65	0.53	0.28
Technological adaptivity	0.83	0.67	0.45
Agile learning	0.82	0.66	0.44
Career navigation	0.95	0.77	0.59
<b>Canonical variate <math>W_1</math> variables</b>			
Self-reliance	0.91	0.74	0.55
Personal resilience	0.78	0.63	0.40
Work resilience	0.92	0.75	0.56
Career satisfaction	0.56	0.45	0.21

†, Canonical loadings:  $r_c$ ; ‡, canonical cross-loadings:  $r_c$ .

canonical variate (labelled as  $V_1$ ), followed by career curiosity, career confidence and hope ( $r_c \geq 0.71 - 0.73$ ; large practical effect). Career control, career concern, optimism, self-efficacy and resiliency also had a positive and large practical effect ( $r_c \geq 0.51 - 0.69$ ) on explaining the canonical variate ( $V_1$ ). According to the redundancy analysis in Table 4, the  $V_1$  variables accounted for a large proportion of variance (0.52; large practical effect) in the  $V_1$  canonical variate.

Self-reliance ( $r_c = 0.91$ ) and work resilience ( $r_c \geq 0.92$ ) had the greatest influence (large practical effect) in positively explaining the self-reflectiveness canonical variate (labelled as  $W_1$ ), followed by the positive, large practical effect of personal resilience ( $r_c = 0.78$ ) and career satisfaction ( $r_c = 0.56$ ). According to the redundancy analysis in Table 4, the  $W_1$  variables accounted for a large proportion of variance (0.65; large practical effect) in the  $W_1$  canonical variate.

In terms of the canonical cross-loading, Table 3 and Figure 1 show four clusters of the career self-reactiveness canonical variate ( $V_1$ ) variables that varied in the degree of variance explained in the career self-reflectiveness canonical variate ( $W_1$ ) variables: (1) the career agility variables of career navigation, technological adaptivity and agile learning had the highest positive, practical large effect cross-loadings ( $r_c \geq 0.66 - 0.77$ : 44% – 59%) with the  $W_1$  variables; (2) the career adaptability variables of career control, career curiosity, career confidence and the PCQ hope construct had a similar range of positive, large practical effect cross-loadings ( $r_c \geq 0.56 - 0.59$ : 32% – 35%) with the  $W_1$  variables; (3) CAAS career concern ( $r_c = 0.54$ : 29%) and PCQ optimism ( $r_c = 0.53$ : 28%) and (4) PCQ self-efficacy ( $r_c = 0.46$ : 21%) and resiliency ( $r_c = 0.41$ : 17%) had a relatively lower range of positive and large practical effect cross-loading correlations with the  $W_1$  variables. Overall, the career navigation variable had the largest correlation ( $r_c = 0.77$ : 59%) with the  $W_1$  variables. According to the redundancy analysis in Table 4, the  $V_1$  variables accounted for a large proportion of variance (0.43; large practical effect) in the  $W_1$  canonical variate variables. The  $W_1$  variables accounted for a large but lower proportion of variance (0.34; large practical effect) in the  $V_1$  canonical variate variables.

The  $W_1$  variables of work resilience ( $r_c = 0.75$ : 56%; large practical effect) and self-reliance ( $r_c = 0.74$ : 55%, large practical effect) had the largest and positive cross-loading correlations

with the  $V_1$  variables, followed by personal resilience ( $r_c = 0.63$ :40%, large practical effect) and career satisfaction ( $r_c = 0.45$ :21%, large practical effect).

Overall, career satisfaction had the lowest link with the  $V_1$  variables. The results further suggest that relative to the career adaptability and psychological capital variables, the career agility variables had the strongest association with the career resilience variables and vice versa. The psychological capital variables of resiliency and self-efficacy, including career satisfaction, accounted for the least for the reciprocal associations between the  $V_1$  and  $W_2$  variables. The results provided evidence in support of research hypothesis H1.

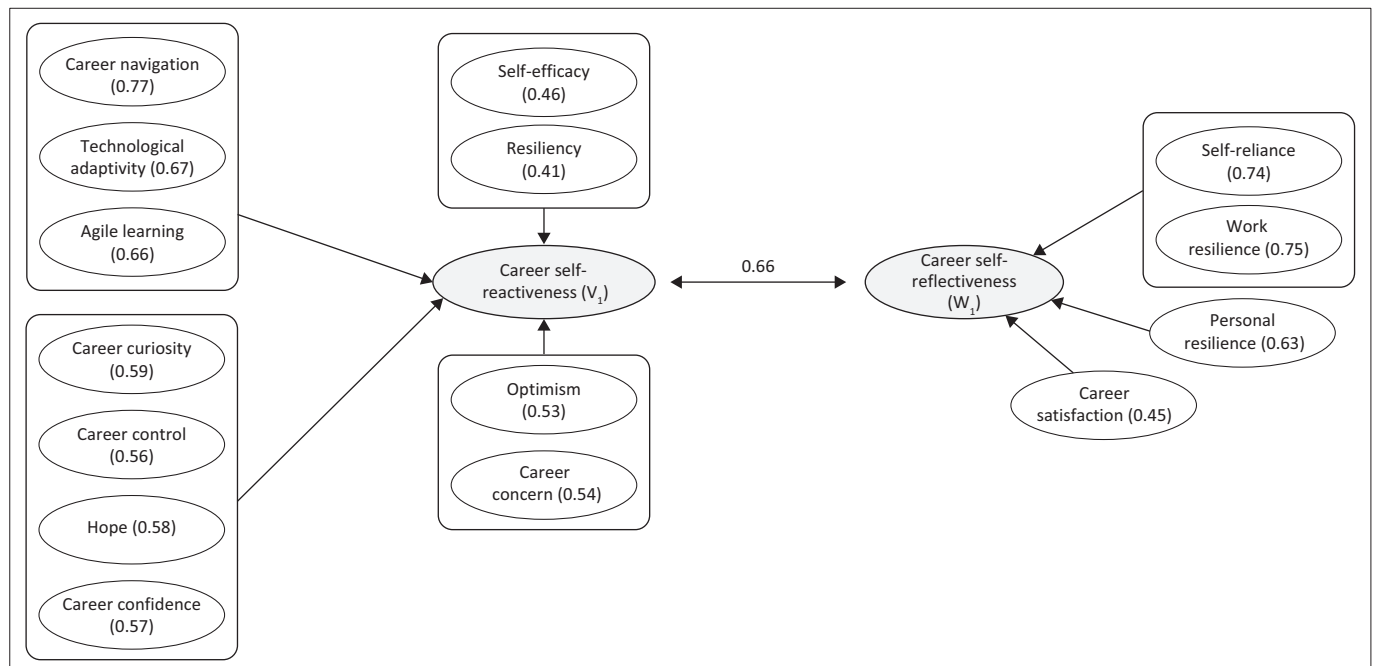
## Discussion

The results corroborated the CHAT (Chen & Hong, 2020a, 2020b) premise that career-adaptive attributes are interconnected and mutually help to reinforce career human agency. Four synthetic common themes arose from the reciprocal correspondence among attributes of career self-reactiveness (career adaptability, PsyCap and career agility) and attributes of career self-reflectiveness (career resilience and career satisfaction). These four themes illustrate the mutually reinforcing dynamics among career-adaptive attributes of career self-reactiveness and career self-reflectiveness.

The first common theme points to the dynamics of *adaptive readiness* towards the digital-era work world. The findings confirm the premise that career self-reactiveness (the ability to proactively and intentionally act in ways that enable coping and adapting to unpredictable and fortuitous conditions) interacts with the ability to gauge contextual

**TABLE 4:** Canonical function 1: Canonical redundancy analysis.

Canonical variate	Proportion of variance explained by own canonical variables	Canonical $R^2$	Proportion of variance explained by opposite canonical variables
$W_1$	0.65	0.66	0.43
$V_1$	0.52	0.66	0.34



Note: Canonical cross-loadings shown in brackets.

**FIGURE 1:** Empirical model of the canonical correlation cross-loading results Function 1.

influences on career goals and successful adaptation to changing workplace conditions (career self-reflectiveness: Chen & Hong, 2020a, 2020b).

The findings highlight career agility (readiness to proactively manage one's adaptation to changes in the technology-driven career and job environment) as an important attribute of career self-reactiveness. Individuals' optimism towards and readiness to adapt to and embrace technological development as offering new opportunities for career, job, personal growth and skills development (technological adaptivity, agile learning, career navigation: Coetzee et al., 2021) seemed to correspond with career self-reflectiveness operationalised as career resilience and vice versa.

Self-reliance and work resilience reflected participants' appraisal of their self-efficacious agentic adaptation to changing technological and work conditions as investment in career growth and opportunities for skills development (Coetzee et al., 2015). The confluent appraisal denoted by self-reliance and work resilience corresponded with participants' adaptive readiness or willingness to proactively adapt to changes in the technology-driven career and job environment (career agility) and vice versa. The findings seem to support research that demonstrated positive associations between employees' career agility and their appraisal of the organisation as fulfilling its obligations to supply supportive conditions that make adaptation, learning and upskilling possible in changing work contexts (Coetzee et al., 2022a).

The second common theme pertains to the dynamic interplay among attributes of *goal-directed adaptability* in career self-reactiveness (operationalised as career control, career curiosity, career confidence, hope) and career self-reflectiveness (operationalised as personal resilience). The findings suggest that agentic career decidedness (career control), envisioning and navigating future work selves (career curiosity), self-efficacious problem solving to achieve goals (career confidence: Johnston, 2018) and an agentic goal-directed motivation to succeed in changing conditions (hope: Luthans & Youssef-Morgan, 2017) corresponded with personal resilience. Reciprocally, personal resilience (proactive adjustment of career and skills development goals in response to changes in company structure and strategy: Coetzee et al., 2015) corresponded with goal-directed adaptability as denoted by the attributes of career control, career curiosity, career confidence, and hope. The research highlights goal-directed adaptability in the form of decidedness about goals one strives to pursue (career control), exploring both self and the environment in goal pursuit (career curiosity), and persisting towards achieving career goals (career confidence) as important resources of career-adaptive behaviours (Klehe et al., 2021). This study further indicates positive associations between hope (i.e. positive goal-directed agency in pathways for achieving goals) and self-directed career management, career self-efficacy and the goal-directed behaviours of career adaptability (Baluku et al., 2020; Douglas & Duffy, 2015; Johnston, 2018; Luthans & Youssef-Morgan, 2017).

The third common theme elucidated *career intentionality towards goal-achievement* as a core dynamic among career self-reactiveness (operationalised as career concern and optimism) and career self-reflectiveness (operationalised as career satisfaction). The findings seem to speak to Chen and Hong's (2020a) view of career intentionality as a third pillar of career human agency. They explain intentions direct one's purposeful preparation and planning for the achievement of career goals. Career concern (intrinsic motivation to prepare for the future through career planning: Johnston, 2018; Klehe et al., 2021) and optimism (positive expectations of achieving goals despite adversity) (Luthans & Youssef-Morgan, 2017) corresponded with career satisfaction. Reciprocally, the positive appraisal of progress towards career-life goals (career satisfaction: Spurk et al., 2015), corresponded with participants' career concern and optimism.

The findings indicate that an optimistic future orientation, attitudes of planfulness and motivation to prepare for the future are important features of career satisfaction. On the other hand, career satisfaction can be explained by the motivation to prepare and plan for the continual achievement of future-oriented career goals and a positive expectancy to achieve these goals. Previous research shows in this regard that optimistic, future-oriented individuals adapt better in career transitions and exhibit satisfaction (Baluku et al., 2020).

The fourth common theme pertained to *career forethought in goal achievement* as suggested by the positive association between self-efficacy and resiliency (career self-reactiveness) and career satisfaction (career self-reflectiveness). The findings seem to relate to Chen and Hong's (2020a) view of career forethought as a fourth pillar of career human agency. They explain that individuals have the ability to set goals and anticipate outcomes, which motivates the achievement of goals.

Self-efficacy (intrinsic confidence and motivation to put in the effort to succeed at challenging tasks) and resiliency (determination to go beyond the normal in adapting to changing demands and bouncing back from adversity to attain success: Del Castillo & Lopez-Zafra, 2022; Luthans & Youssef-Morgan, 2017) corresponded with positive cognitive appraisal of progress made towards life-career goal achievement (career satisfaction). Research generally suggests that success experiences stimulate the development of self-efficacy and that PsyCap attributes moderate the impact of job conditions that may result in higher levels of satisfaction (Del Castillo & Lopez-Zafra, 2022; Luthans & Youssef-Morgan, 2017). This study further shows that, reciprocally, the positive appraisal and satisfaction of career goal achievement involve the conviction that one can mobilise the motivation and courses of action needed to succeed (self-efficacy) and bounce back from adversity or perceived obstacles and setbacks (resiliency) towards the successful achievement of career goals. Career forethought

**TABLE 5:** Practical implications for career human agency counselling.

Career human agency theme	Adaptive readiness	Goal-directed adaptability	Career intentionality toward goal-achievement	Career forethought in goal achievement
<b>CHAT pillar: Career self-reactiveness</b> (self-regulated, intentional proactivity in coping and adapting)	Career agility (technological adaptability, agile learning, career navigation)	Career adaptability (career control, career curiosity, career confidence) Psychological capital (hope)	Career adaptability (career concern) Psychological capital (optimism)	Psychological capital (self-efficacy, resiliency)
<b>CHAT pillar: Career self-reflectiveness</b> (appraisal of contextual influences on personal career success)	Career resilience (self-reliance, work resilience)	Career resilience (personal resilience)	Career satisfaction	Career satisfaction
<b>Corresponding characteristics of career human agency</b>	Self-efficacious, optimistic appraisal of and readiness to adapt to changing technological and work conditions, including upskilling and new learning.	Goal-directed motivation to succeed in changing conditions through agentic decidedness, envisioning future work selves, self-efficacious problem solving and pro-active adjustment of development goals.	Positive appraisal of progress towards career-life goals fostered by an intrinsic motivation to intentionally prepare for the future through career planning and having positive expectations of achieving goals despite adversity.	Positive appraisal of progress towards career-life goals fostered by self-confidence, determination and motivation for making a concerted effort to succeed and bounce back from adversity.
<b>Career counselling implication</b>	Assess client's career agility including awareness of, and attitude towards changing technological and work conditions, including readiness and self-confidence in adapting. Counsel and guide on perceptions and beliefs blocking adaptive readiness and agency.	Assess client's personal resilience to adapt and succeed when confronted with changing conditions. Counsel and guide on agentic development of career adaptability resources for enhanced personal resilience.	Assess client's career satisfaction, future orientation, career planfulness and motivation to succeed despite adversity. Counsel and guide on agentic development of career concern and optimism for career goal achievement. Counsel on fears of overcoming adversity impacting career goals.	Assess client's career satisfaction, self-efficacy and resiliency. Counsel and guide client towards actively planning and preparing for the career future including coping skills and fears or beliefs that block self-confidence and motivation for intentional career forethought behaviour.

CHAT, career human agency theory.

and self-efficacious intentionality direct individuals' career human agency through purposeful preparation and planning for the achievement of career goals (Chen & Hong, 2020a, 2020b).

## Implications

Theoretically, the findings added richness to the CHAT (Chen & Hong, 2020a, 2020b) by going beyond mere theory. The findings provided empirical evidence of career-adaptive attributes that help explain the simultaneous interaction between the human agency pillars of career self-reactiveness and career self-reflectiveness. The observed correspondence among the study constructs that denoted these two CHAT pillars included the presence of adaptive readiness, goal-directed adaptability, career forethought and career intentionality as characteristics of career human agency. Practically, career counselling interventions that apply the CHAT (Chen & Hong, 2020a) may use the findings to measure career-adaptive behaviours that help cultivate career human agency. Career conversations may utilise assessments of the study constructs to guide clients' career self-reactiveness and career self-reflectiveness for greater self-awareness and intentionality in career adaptation. Table 5 summarises the core implications for career counselling.

## Limitations and future research

The exploratory cross-sectional research design limits the generalisability of the findings to the study sample. Moreover, no cause-effect relations could be established. The CCA approach maximised the associations between the two variable sets, which may not necessarily be reproduced among the variables in another data set. Future replication studies in various occupational and socio-cultural contexts may help to verify the study findings or point to different themes relevant

to career human agency. Future studies could also use multivariate multiple regression and structural equation modelling to model the relationships between constructs of career self-reactiveness and career self-reflectiveness.

## Conclusion

The study extends the understanding of adaptive readiness, goal-directed adaptability, career forethought and career intentionality in agentic goal achievement. Taken together, these career-adaptive attributes show a dynamic, mutually reinforcing correspondence between career human agency attributes that relate to career self-reactiveness and career self-reflectiveness. Given the importance of human agency in the unpredictable technology-driven work world, it is important to continue research on attributes that foster career-adaptive behaviours.

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## Data availability

Data availability only upon approval of the corresponding author's research institution's research ethics committee and upon formal reasonable request to the author.

## Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors.

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## Appendix A

**TABLE 1-A1:** Summary of the confirmatory factor analysis paired factor co-variances estimates and confidence levels.

Variables	Estimate	SE	z	p	95% CI lower	95% CI upper
Self-efficacy – Hope	0.155	0.022	7.007	< 0.001	0.111	0.198
Self-efficacy – Resiliency	0.151	0.024	6.292	< 0.001	0.104	0.198
Self-efficacy – Optimism	0.155	0.025	6.225	< 0.001	0.107	0.204
Self-efficacy – Career_Concern	0.110	0.020	5.505	< 0.001	0.071	0.150
Self-efficacy – Career_Control	0.148	0.023	6.417	< 0.001	0.103	0.193
Self-efficacy – Career_Curiosity	0.129	0.021	6.107	< 0.001	0.087	0.170
Self-efficacy – Career_Confidence	0.127	0.020	6.471	< 0.001	0.089	0.166
Self-efficacy – Technological_adaptivity	0.173	0.027	6.314	< 0.001	0.119	0.227
Self-efficacy – Agile_learning	0.217	0.032	6.737	< 0.001	0.154	0.281
Self-efficacy – Career_navigation	0.195	0.028	6.935	< 0.001	0.140	0.250
Self-efficacy – Self-Reliance	0.178	0.029	6.107	< 0.001	0.121	0.236
Self_efficacy – Personal_resilience	0.123	0.025	4.982	< 0.001	0.074	0.171
Self_efficacy – Work_resilience	0.172	0.027	6.419	< 0.001	0.119	0.225
Self-efficacy – Satisfaction	0.202	0.040	5.085	< 0.001	0.124	0.280
Hope – Resiliency	0.236	0.032	7.378	< 0.001	0.174	0.299
Hope – Optimism	0.267	0.036	7.428	< 0.001	0.197	0.338
Hope – Career_Concern	0.193	0.027	7.059	< 0.001	0.139	0.247
Hope – Career_Control	0.212	0.029	7.295	< 0.001	0.155	0.269
Hope – Career_Curiosity	0.187	0.027	7.018	< 0.001	0.135	0.240
Hope – Career_Confidence	0.187	0.025	7.448	< 0.001	0.138	0.236
Hope – Technological_adaptivity	0.262	0.036	7.275	< 0.001	0.192	0.333
Hope – Agile_learning	0.350	0.043	8.124	< 0.001	0.266	0.434
Hope – Career_navigation	0.280	0.036	7.850	< 0.001	0.210	0.349
Hope – Self-Reliance	0.244	0.037	6.667	< 0.001	0.172	0.316
Hope – Personal_resilience	0.230	0.034	6.789	< 0.001	0.163	0.296
Hope – Work_resilience	0.245	0.034	7.205	< 0.001	0.178	0.312
Hope – Satisfaction	0.392	0.055	7.183	< 0.001	0.285	0.499
Resiliency – Optimism	0.267	0.040	6.757	< 0.001	0.190	0.344
Resiliency – Career_Concern	0.184	0.031	5.890	< 0.001	0.123	0.246
Resiliency – Career_Control	0.231	0.035	6.661	< 0.001	0.163	0.299
Resiliency – Career_Curiosity	0.207	0.032	6.437	< 0.001	0.144	0.270
Resiliency – Career_Confidence	0.200	0.030	6.755	< 0.001	0.142	0.258
Resiliency – Technological_adaptivity	0.268	0.041	6.528	< 0.001	0.187	0.348
Resiliency – Agile_learning	0.333	0.048	6.949	< 0.001	0.239	0.427
Resiliency – Career_navigation	0.260	0.040	6.542	< 0.001	0.182	0.338
Resiliency – Self-Reliance	0.271	0.044	6.228	< 0.001	0.186	0.357
Resiliency – Personal_resilience	0.233	0.040	5.827	< 0.001	0.154	0.311
Resiliency – Work_resilience	0.270	0.040	6.698	< 0.001	0.191	0.349
Resiliency – Satisfaction	0.221	0.059	3.739	< 0.001	0.105	0.337
Optimism – Career_Concern	0.239	0.035	6.812	< 0.001	0.170	0.307
Optimism – Career_Control	0.267	0.038	7.102	< 0.001	0.193	0.341
Optimism – Career_Curiosity	0.225	0.034	6.630	< 0.001	0.158	0.291
Optimism – Career_Confidence	0.227	0.032	7.110	< 0.001	0.164	0.289
Optimism – Technological_adaptivity	0.323	0.046	7.042	< 0.001	0.233	0.413
Optimism – Agile_learning	0.400	0.053	7.540	< 0.001	0.296	0.504
Optimism – Career_navigation	0.342	0.045	7.548	< 0.001	0.253	0.431
Optimism – Self_Reliance	0.283	0.045	6.242	< 0.001	0.194	0.372
Optimism – Personal_resilience	0.306	0.045	6.828	< 0.001	0.218	0.394
Optimism – Work_resilience	0.313	0.044	7.085	< 0.001	0.227	0.400
Optimism – Satisfaction	0.461	0.069	6.702	< 0.001	0.326	0.596
Career_Concern – Career_Control	0.410	0.042	9.852	< 0.001	0.329	0.492
Career_Concern – Career_Curiosity	0.357	0.038	9.377	< 0.001	0.283	0.432
Career_Concern – Career_Confidence	0.291	0.033	8.744	< 0.001	0.226	0.356
Career_Concern – Technological_adaptivity	0.341	0.043	7.946	< 0.001	0.257	0.425
Career_Concern – Agile_learning	0.491	0.052	9.426	< 0.001	0.389	0.593
Career_Concern – Career_navigation	0.366	0.042	8.741	< 0.001	0.284	0.448
Career_Concern – Self-Reliance	0.332	0.045	7.372	< 0.001	0.244	0.420
Career_Concern – Personal_resilience	0.290	0.040	7.255	< 0.001	0.212	0.369

Appendix continues on next page →

**TABLE 1-A1 (Continues):** Summary of the confirmatory factor analysis factor paired co-variances estimates and confidence levels.

Variables	Estimate	SE	z	p	95% CI lower	95% CI upper
Career_Concern – Work resilience	0.300	0.039	7.616	< 0.001	0.223	0.377
Career_Concern – Satisfaction	0.311	0.057	5.441	< 0.001	0.199	0.423
Career_Control – Career_Curiosity	0.414	0.042	9.863	< 0.001	0.332	0.497
Career_Control – Career_Confidence	0.379	0.036	10.428	< 0.001	0.308	0.450
Career_Control – Technological_adaptivity	0.401	0.047	8.576	< 0.001	0.309	0.493
Career_Control – Agile_learning	0.500	0.052	9.548	< 0.001	0.397	0.602
Career_Control – Career_navigation	0.412	0.044	9.314	< 0.001	0.325	0.498
Career_Control – Self-Reliance	0.398	0.050	7.977	< 0.001	0.300	0.496
Career_Control – Personal_resilience	0.326	0.043	7.635	< 0.001	0.243	0.410
Career_Control – Work_resilience	0.354	0.043	8.261	< 0.001	0.270	0.438
Career_Control – Satisfaction	0.300	0.060	4.973	< 0.001	0.182	0.418
Career_Curiosity – Career_Confidence	0.345	0.034	10.087	< 0.001	0.278	0.412
Career_Curiosity – Technological_adaptivity	0.392	0.045	8.637	< 0.001	0.303	0.481
Career_Curiosity – Agile_learning	0.501	0.051	9.762	< 0.001	0.401	0.602
Career_Curiosity – Career_navigation	0.405	0.043	9.426	< 0.001	0.321	0.489
Career_Curiosity – Self-Reliance	0.358	0.046	7.751	< 0.001	0.268	0.449
Career_Curiosity – Personal_resilience	0.299	0.040	7.470	< 0.001	0.220	0.377
Career_Curiosity – Work_resilience	0.335	0.041	8.222	< 0.001	0.255	0.415
Career_Curiosity – Satisfaction	0.328	0.058	5.700	< 0.001	0.215	0.441
Career_Confidence – Technological_adaptivity	0.351	0.040	8.711	< 0.001	0.272	0.430
Career_Confidence – Agile_learning	0.427	0.044	9.590	< 0.001	0.339	0.514
Career_Confidence – Career_navigation	0.362	0.038	9.508	< 0.001	0.287	0.436
Career_Confidence – Self-Reliance	0.324	0.041	7.822	< 0.001	0.243	0.405
Career_Confidence – Personal_resilience	0.257	0.035	7.278	< 0.001	0.188	0.327
Career_Confidence – Work_resilience	0.301	0.036	8.276	< 0.001	0.230	0.372
Career_Confidence – Satisfaction	0.285	0.052	5.497	< 0.001	0.183	0.386
Technological_adaptivity – Agile_learning	0.680	0.071	9.597	< 0.001	0.541	0.819
Technological_adaptivity – Career_navigation	0.561	0.060	9.409	< 0.001	0.444	0.678
Technological_adaptivity – Self-Reliance	0.480	0.062	7.739	< 0.001	0.358	0.601
Technological_adaptivity – Personal_resilience	0.413	0.053	7.740	< 0.001	0.309	0.518
Technological_adaptivity – Work_resilience	0.447	0.054	8.212	< 0.001	0.341	0.554
Technological_adaptivity – Satisfaction	0.516	0.076	6.793	< 0.001	0.367	0.665
Agile_learning – Career_navigation	0.739	0.067	11.006	< 0.001	0.607	0.871
Agile_learning – Self-Reliance	0.586	0.070	8.359	< 0.001	0.449	0.724
Agile_learning – Personal_resilience	0.545	0.062	8.747	< 0.001	0.423	0.667
Agile_learning – Work_resilience	0.538	0.061	8.880	< 0.001	0.419	0.656
Agile_learning – Satisfaction	0.625	0.088	7.130	< 0.001	0.453	0.797
Career_navigation – Self-Reliance	0.589	0.066	8.891	< 0.001	0.459	0.719
Career_navigation – Personal_resilience	0.507	0.055	9.135	< 0.001	0.398	0.615
Career_navigation – Work_resilience	0.547	0.057	9.631	< 0.001	0.435	0.658
Career_navigation – Satisfaction	0.518	0.074	6.991	< 0.001	0.373	0.663
Self_Reliance – Personal_resilience	0.571	0.068	8.345	< 0.001	0.437	0.706
Self_Reliance – Work_resilience	0.593	0.069	8.541	< 0.001	0.457	0.730
Self-Reliance – Satisfaction	0.432	0.077	5.629	< 0.001	0.281	0.582
Personal_resilience – Work_resilience	0.557	0.061	9.134	< 0.001	0.438	0.677
Personal_resilience – Satisfaction	0.505	0.077	6.582	< 0.001	0.354	0.655
Work_resilience – Satisfaction	0.511	0.074	6.907	< 0.001	0.366	0.656

SE, standard error; CI, confidence interval.